ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9 and 86

[FRL–5258–7]

RIN 2060–AF49

Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: Evaporative and Refueling Emission Regulations for Gasoline- and Methanol-Fueled Light-Duty Vehicles and Light-Duty Trucks and Heavy-Duty Vehicles; Technical Amendments

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule; technical amendments.

SUMMARY: On March 24, 1993 EPA finalized a new test procedure to measure evaporative emissions from motor vehicles. The amendments contained in this document modify several of the test procedure's tolerances, equipment specifications, and procedural steps.

In compliance with the Paperwork Reduction Act, this document announces that the information collection requirements contained in the Evaporative Emissions Final Rule were approved by the Office of Management and Budget on May 9, 1994.

Also, this document incorporates by reference the California Regulatory Requirements Applicable to the Evaporative Emissions Program (January 4, 1995). EPA will accept test data developed using the California procedure for demonstrating compliance with the 1996 model year federal evaporative emissions requirement for purposes of certification.

DATES: The amendments to 40 CFR part 86 are effective October 23, 1995, unless notice is received by September 22, 1995, that adverse or critical comments will be submitted or that an opportunity to submit such comments at a public hearing is requested. If the Agency receives such comments or a request for a public hearing by September 22, 1995, EPA will then publish a subsequent **Federal Register** document withdrawing from this action only those items which are specifically listed in those comments or in the request for a public hearing. See **SUPPLEMENTARY INFORMATION** for further discussion on submission of public comment.

The incorporation by reference of the publications listed in the regulations is approved by the director of the **Federal Register** as of October 23, 1995.

The information collection requirements contained in 40 CFR 86.096–7, 86.096–8, 86.096–9, 86.096–10, 86.096–14, 86.096–21, 86.096–23, 86.096–26, 86.096–30, 86.096–35, 86.097–9, 86.098–23, 86.099–8, 86.099–9, and 86.099–10, which were published at 58 FR 16002, March 24, 1993, and the amendments to 40 CFR part 9 are effective August 23, 1995.

ADDRESSES: Interested parties may submit written comments (in duplicate, if possible) to Public Docket No. A–94–35 at Air Docket Section, U.S. Environmental Protection Agency, First Floor, Waterside Mall, Room M–1500, 401 M Street SW., Washington, DC 20460 (telephone 202–260–7548). Materials relevant to the evaporative emissions final rule and this direct final rule are available for inspection in Public Dockets A–89–18 and A–94–35 at the above address.

FOR FURTHER INFORMATION CONTACT: Mr. Alan Stout, (313) 741–7805.

SUPPLEMENTARY INFORMATION:

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I. Introduction

On March 24, 1993 the Environmental Protection Agency (EPA) published a final rule establishing new requirements to test vehicles for evaporative emissions (58 FR 16002), which will apply to new motor vehicles beginning in model year 1996 according to a phased-in compliance schedule. The procedure was amended with several corrections and minor changes by a direct final rule, which was published June 28, 1993 (58 FR 34535). As EPA and manufacturers have come closer to implementing the new test procedure, it has become clear that there are several potential changes to the test procedure that would make testing simpler, safer, and less resource-intensive. In addition, the Agency wants to harmonize its evaporative emission test procedure with that of the California Air Resources Board (CARB).

EPA has worked closely with the California Air Resources Board and manufacturers to identify all the changes to the test procedure specifications that could improve the test without affecting test stringency. The regulations contained in this document reflect these discussions. This document is published as a direct final rule. In the case of adverse comments received in response to this document by September 22, 1995, EPA will remove from the regulations those provisions that receive comment. EPA may, at its discretion, propose such provisions in a future rulemaking action.

A copy of this document is also available electronically on the Technology Transfer Network (TTN), which is an electronic bulletin board system (BBS) operated by EPA's Office of Air Quality Planning and Standards. The service is free of charge, except for the cost of the phone call. Users are able to access and download TTN files on their first call using a personal computer and modem according to the following information.

TTN BBS: 919–541–5742
(1200–14400 bps, no parity, 8 data bits, 1 stop bit)
Voice Helpline: 919–541–5384
Also accessible via Internet: TELNET ttnbbs.rtpnc.epa.gov
Off-line: Mondays from 8:00 AM to 12:00 Noon ET

Users who have not called TTN previously will first be required to answer some basic informational questions for registration purposes. After completing the registration process, users must proceed through the following menu choices from the Top Menu to access information on this rulemaking.

<T> GATEWAY TO TTN TECHNICAL AREAS (Bulletin Boards)
<M> OMS—Mobile Sources Information
<K> Rulemaking & Reporting
<1> Light Duty
<7> File area #7. . . Evaporative Emissions

At this point, the system will list all available files in the chosen category in reverse chronological order with brief descriptions. To download files, users must select a transfer protocol that is supported by the terminal software on their own computer, then set their own software to receive the file using that same protocol.

If unfamiliar with handling compressed (i.e. ZIP'ed) files, users should go to the TTN top menu, System Utilities (Command: 1) to identify the program that must be downloaded to un-ZIP the files of interest. After completing a session, users can quit the TTN BBS with the <Goodbye> command.

Please note that due to differences between the software used to develop the document and the software into which the document may be downloaded, changes in format, page length, etc. may occur.

II. Overview of Technical Amendments

In addition to the test procedure changes, EPA has in this rule addressed the issue of reliance on CARB's test procedure (i.e., the California Regulatory Requirements Applicable to the Evaporative Emissions Program, January 4, 1995) for testing 1996 model year vehicles for evaporative emissions. EPA is modifying the existing evaporative emission regulations to accept manufacturers' data showing compliance with CARB's 1996 model year certification requirements as demonstration of compliance with the evaporative emissions portion of the federal certification requirements for the 1996 model year. EPA's confirmatory and in-use testing of 1996 model year vehicles certified in this way will also rely on the CARB procedure for evaluating compliance with test requirements. EPA's evaporative emission regulations have been modified to incorporate by reference relevant CARB regulations. EPA intends to evaluate CARB's pending technical amendments, once finalized, and will approve use of the resulting modified procedure for 1996 model year vehicles, provided the modified procedure maintains at least the same level of control as CARB's existing procedure.

The more flexible arrangement for certifying 1996 model year vehicles should have no negative air quality impact. Because of the uncertainty surrounding EPA's technical amendments to the evaporative emission test procedure, especially where they affect procurement of test equipment, manufacturers have been constrained in their ability to conduct testing according to federal specifications. Given the direction CARB has taken with its own pending technical amendments, EPA is confident that the CARB procedure will be as stringent, or nearly as stringent, as the EPA procedure. Furthermore, since the enhanced test requirements apply to only 20 percent of each manufacturer's 1996 model year fleet, the air quality impact of any compromise in test stringency would be very limited.

Following promulgation of this rule and the pending changes to the CARB procedure, the remaining differences of significance between EPA's and CARB's evaporative emission test procedures are limited to the specifications for temperatures and fuel volatility. EPA is pursuing a test program to better understand the relative stringency of the two sets of test conditions and to decide if data generated according to the CARB test procedure will be acceptable for federal testing on a long-term basis. The same information will be factored into the decision related to carryover of data from the CARB test procedure for federal certification in subsequent model years.

The most significant changes to the test procedure fall into three categories: (1) Control of fuel tank temperature and pressure during running loss testing, (2) air circulation during the diurnal emission test, and (3) a provision for a simplified procedure for generating fuel temperature profiles for the running loss test. Each of these areas is briefly described below.

The issues of greatest concern relate to controlling fuel tank temperature and pressure during the running loss test. These technical amendments incorporate several changes to deal with these concerns. For example, the procedure for outdoor testing to generate fuel temperature profiles now allows the option of stabilizing vehicle and fuel temperatures to 95 °F before driving. Also, determination of compliance with the fuel tank pressure limit during driving on a dynamometer would depend on control of vapor temperatures throughout the running loss test; conversely, measurement of fuel tank pressure and vapor temperature may be omitted at the discretion of those responsible for testing. Another change allows temporary exceedances to the fuel tank pressure limit during driving on a dynamometer to account for potentially artificial tank heating effects in the laboratory. Finally, equipment specifications related to heating and cooling the vehicle's fuel tank have been broadened to increase the degree of control that technicians have in controlling fuel tank temperatures.

Another important issue was the requirement in the initial final rule to maintain a specified wind speed underneath the vehicle during diurnal emission testing. The regulations contain a new requirement to control ambient temperatures underneath the test vehicle and allow an option to use an established fan configuration to meet the required wind speed specification (5 mph). This change provides an option to comply with the wind speed requirement without measuring underbody air velocity on every test.

Also, EPA has included in the regulations a provision giving general guidance for use of a heated wind tunnel for generating fuel temperature profiles. Further work will be required in the certification process to implement the policy; for example, to determine what constitutes acceptable correlation between wind tunnel and outdoor fuel temperature profiles, how often and on what vehicles correlation would have to be demonstrated, and how fuel temperature profiles could be carried over to subsequent model years.

Manufacturers are required to submit either test data or an engineering evaluation to demonstrate compliance with evaporative emission standards at high altitudes. One manufacturer has expressed to EPA its concern that a fuel temperature profile generated at low altitude has limited applicability for testing at high altitude, which causes difficulty in testing methanol-fueled vehicles. The existing regulatory language for high-altitude requirements provides the Agency limited discretion to adjust the test procedure to accommodate changes related to fuel temperature profiles. EPA believes it is inappropriate to address this issue in a direct final rulemaking, since any change that cannot be accommodated under the Agency's existing discretion would require a formal proposal and a period for public comment. EPA encourages interested manufacturers to work with EPA's Certification Division to resolve this issue.

In addition to the changes to the evaporative emission test procedure, these technical amendments include revised language related to the test requirements for onboard refueling vapor recovery, initially finalized April 6, 1994 (59 FR 16262), to clarify test provisions and make typographical corrections.

III. List of Changes to Test Procedures

The following list describes the individual changes made to the test procedure. Explanation and, where appropriate, EPA's interpretation of the resulting regulatory language is provided.

Vehicle Preconditioning

1. Change initial soak to 6 hours minimum:

—The procedure previously called for a 12-hour minimum soak before the preconditioning drive, though EPA reserved the option of conducting testing with only a 6-hour soak. The shorter soak time is sufficient to stabilize the vehicle.

2. Make the initial soak and refueling event optional for a second test run on a vehicle (or optional for any SEA test):

—Vehicles that have already been tested in the laboratory have been sufficiently stabilized with respect to temperature and fuel effects.

3. Require vehicles to be parked within 5 minutes after the refueling procedure:

—The regulations previously required the test vehicle to be parked within 5 minutes after completion of the preconditioning drive. Since test vehicles must be refueled during the hour following the preconditioning drive, the timing of the parking event is best specified relative to completion of the refueling event.

4. Precondition multiple canisters as a set unless they are arranged in parallel:

—While canisters configured in parallel should be preconditioned individually, as the initial final rule required, EPA agrees that evaporative canisters arranged in a series configuration should be preconditioned as a set to best simulate normal vehicle operation.

5. Add requirement to use a service port on evaporative canisters (if so equipped) for loading and purging steps:

—Provided that manufacturers install such service ports on their production canisters, EPA agrees that it is appropriate to use the ports for the preconditioning procedure.

6. Allow replacement canister to collect vapors during canister preconditioning:

—The regulations have been modified to clarify that it is acceptable to collect fuel tank vapors that may escape during the period that the vehicle's canister is disconnected. This arrangement would provide a safety benefit without affecting the condition of the test vehicle.

7. Specify a representative vapor load to the canister for all flexible-fueled and methanol-fueled vehicles:

—The regulations previously called for representative vapor loading for dedicated methanol-fueled vehicles only. A vehicle using any amount of methanol should not have its canister loaded with pure butane, since the engine's electronic controls depend on a vapor composition from the canister being similar to that coming from the fuel tank. Using repeated diurnal heat builds to precondition the canister for the two-day diurnal sequence would provide, by definition, a representative vapor composition. EPA anticipates that the best way to conduct bench-loading for either test sequence would be to generate vapors from an off-board fuel tank or other reservoir partially filled with the type of fuel to be used in the subsequent test run.

8. Delete parenthetical reference to volumetric flow rate equivalent to 40 g/hr butane load:

—The regulations previously provided a conversion of the mass flow rate into volumetric units for the convenience of the reader. Because this conversion is valid only at sea level, it has been deleted.

Diurnal Emission Test

9. Provide flexibility to satisfy 5-mph wind speed requirement near tank with a demonstrated configuration:

—This provision allows one to conduct diurnal emission tests without routinely measuring wind speed under the fuel tank. Consistently using a given fan configuration that has been demonstrated to satisfy the wind speed requirement on the test vehicle or a broad range of vehicles would be sufficient to show adequate airflow underneath the test vehicle.

10. Add undertank thermocouple for instantaneous and average temperature tolerances and relax tolerance on sidewall temperatures to ±5 °F:

—The new requirement to measure air temperatures under the fuel tank becomes the primary measurement for following the ambient fuel temperature profile. The sidewall temperature measurement serves the purpose of ensuring adequate air mixing in the enclosure and providing a temperature measurement representative of the overall enclosure volume (for calculation of mass emissions).

11. Allow passive fixed-volume diurnal enclosures and change pressure tolerance to ±2 in. H_2O:

—The regulatory language has been broadened to accommodate a different design of a fixed-volume diurnal enclosure and to match the specifications in place for variable-volume enclosures.

12. Delete maximum surface temperature:

—EPA believes that the specified maximum surface temperature does not affect the test vehicle or the emission measurement, and so can be deleted without compromising test effectiveness.

Hot Soak Test

13. Allow a 7-minute interval before the hot soak test; add language to encourage making this interval as short as possible; add language to make sure fans are off at the end of the running loss test:

—EPA continues to believe that the time between the running loss and hot soak tests is very important for an accurate measurement of hot soak emissions. EPA believes a relaxed time specification does not compromise test stringency for several reasons. First, the language for the hot soak tests for both test sequences specifies that the intent of testing is to minimize the time before the hot soak test. Second, new language specifying that fans must be turned off after the running loss test should prevent technicians from artificially cooling the fuel during the period between the test segments. Third, the vehicle continues to operate at idle until just before entry into the hot soak enclosure. Fourth, EPA may make an extra effort to minimize the time interval before the hot soak measurement for its testing. Similarly, EPA may conduct the hot soak test with *no* elapsed time between the end of the running loss test and the beginning of the hot soak test by making a continuous measurement of running loss and hot soak emissions in a running loss enclosure.

14. Delete maximum surface temperature:

—EPA believes that the specified maximum surface temperature does not affect the test vehicle or the emission measurement, and so can be deleted without compromising test effectiveness.

Running loss test

15. Increase maximum flow rate for under-tank blower; increase minimum temperature to 85 °F:

—Increasing the maximum flow rate of the under-tank blower to 4,000 cubic feet per minute (cfm) increases the degree of flexibility available for controlling fuel temperatures. The regulations provide for a maximum flow rate of 6,000 cfm for exceptional circumstances. To prevent a high flow rate of chilled air from condensing generated fuel vapors, the minimum temperature of air from the blower was increased from 70° to 85 °F.

16. Define a tolerance for vapor temperature control, but make measurement of vapor temperature and pressure in the tank optional during lab driving:

—Manufacturers have indicated to EPA that it is important to control vapor temperatures during the running loss test, primarily to prevent artificially high fuel tank pressures and vapor generation. EPA believes it is appropriate to define a tolerance for controlling vapor temperatures similar to that for controlling liquid fuel temperatures. However, because of the technical difficulty of controlling vapor temperatures during driving, the regulations provide the

discretion for any laboratory testing to omit measurement of vapor temperatures. EPA recognizes fuel tank pressure is very dependent on vapor temperatures; therefore, vehicles must comply with the limit on fuel tank pressures only if vapor temperatures are measured and controlled to the specified profile. If a manufacturer chooses not to develop a vapor temperature profile, compliance with the limit on fuel tank pressure will be limited to the required outdoor driving.

To address manufacturers' concern that vapor generation may be affected by uncontrolled vapor temperatures, the regulations now state the expectation that a facility be designed in a way that avoids unrepresentative heating or cooling of the vapor space during the running loss test. Also, in the case of EPA testing without measured vapor temperatures, if a vehicle exceeds an emission standard, the regulations provide manufacturers the opportunity to conduct subsequent testing on that vehicle. If a manufacturer can show that the exceedance is attributable to inadequate control of vapor temperatures, EPA will invalidate its test run. To make such a demonstration, (1) a manufacturer would be expected to conduct a complete test for evaporative emissions, controlling vapor temperatures to the specified tolerances; (2) the vehicle would have to meet the applicable standards for running loss, hot soak and diurnal emissions; and (3) the manufacturer would be expected to explain why the test facility for the EPA test could have caused excessive vapor temperatures. To use this provision, manufacturers would need to have developed a vapor temperature profile prior to certification for the vehicle in question.

17. Allow temporary exceedances of fuel tank pressure limit:

—EPA is aware that characteristics of a laboratory's system for managing fuel tank temperatures could cause the tank pressure during driving on a dynamometer to show transient pressure behavior that does not exist during on-road driving. In response, EPA has modified the regulations to allow a vehicle to exceed the pressure limit for up to 10 percent of the total driving time during the running loss test.

18. Require proportional-speed fan for cooling engine:

—The fixed-speed fan originally specified in the regulations may in some cases provide inadequate cooling for test vehicles. Additional cooling capacity is needed because vehicles are operated on the dynamometer with the hood closed or nearly closed. The regulations, as amended by this final rule, now require a more complex fan; the new fan is considerably more expensive, but does not compromise the effectiveness of the test in any way. Because EPA believes that blowing air underneath the test vehicle, past the engine and the fuel tank, is the best primary source of heat for controlling fuel temperatures, the original provision for this underbody blower is preserved as a supplement to the proportional-speed fan.

19. Allow manufacturers to start the test with fuel at less than 95 °F:

—EPA recognizes that some future vehicles may be designed to keep fuel temperatures below daily peak temperatures. The regulations now describe what manufacturers must do to demonstrate the need for a temperature offset (parking and driving on hot summer days), and set a threshold of 3 °F as the minimum offset that must be demonstrated to make use of this provision.

20. Specify a 6-hour maximum soak before the running loss test; limit the fuel heating rate to 5 °F per hour; and require stabilized fuel temperatures for 1 hour before the running loss test:

—The set of changes to the vehicle stabilization requirement provide better control of fuel temperatures, and thus vapor generation, in the time between the exhaust emission test and the running loss test. The amended regulations provide for a faster heating rate or a longer stabilization period for those vehicles that may have unusually cool fuel following the exhaust emission test.

21. Set average ambient temperature to ±2 °F for the running loss test:

—This change resolves the inconsistency contained in EPA's original regulations regarding specifications for an average ambient temperature during the running loss test.

22. Require ambient temperature measurement at the inlet to the frontal fan; require sidewall temperature measurement for enclosure testing only:

—To clarify the original language, the regulations now specify that temperature measurement upstream of the frontal fan is to be used for demonstrating compliance with ambient temperature tolerances. In enclosure testing, measurement of sidewall temperatures is also required, but will likely be used only for calculation of mass emissions.

23. Allow direct tank heating for controlling fuel tank temperatures:

—The use of heat blankets or other direct methods of heating the fuel tank during the running loss test may be needed for some vehicles whose fuel temperatures cannot easily be controlled with circulating air. The need to supplement the underbody blowers is most likely for designs in which the fuel tank is isolated from the underbody in some way. This provision gives EPA, manufacturers, and contract laboratories the discretion to use direct tank heating if use of the specified fans is insufficient to adequately control fuel temperatures. Direct tank heating should be the exception and should be employed only after attempting to control fuel temperatures with the specified fan configuration. Also, the regulations add detailed cautionary language to prevent the possibility of artificially increasing vapor generation by this method.

24. Allow use of a naturally aspirated running loss enclosure, if it is shown to yield equivalent results:

—EPA anticipates the possibility that running loss enclosures will best be designed with a hybrid configuration; i.e., the test vehicle would consume air from the enclosure ambient, with monitored makeup air coming in through an orifice in a wall of the enclosure. The existing language specifies that air be routed directly from outside the enclosure into the engine's intake system. These technical amendments allow use of a hybrid enclosure if testing shows that emission measurement results are equivalent or superior to those from currently specified enclosures.

25. Correct reference to duration of driving schedule:

—The original language incorrectly identified the duration of the driving schedule for defining fuel temperature tolerances.

26. Adjust densities for 68° F ambient temperature for point-source calculations:

—The original regulations inadvertently based densities on a temperature of 74° F. The corrected densities are hydrocarbons = 16.88 g/ft^3; methanol = 37.71 g/ft^3.

27. Delete requirement for Type J thermocouple:

—Though EPA expects to continue to depend on installation of Type J thermocouples for confirmatory

testing, this specification has been deleted from the regulations to allow manufacturers to conduct their own testing using any temperature sensor that meets the functional specifications for temperature measurement.

Procedure for generating fuel temperature profiles

28. Add the option for developing vapor temperature profiles:

—If manufacturers wish to develop vapor temperature profiles, subsequent testing on those models may include measurement and control of vapor temperatures according to the profile.

29. Allow low-volatility fuel for generating profiles:

—Manufacturers expressed a desire to have the flexibility to use a test fuel with a different volatility than that specified for the outdoor driving procedure; in particular, manufacturers wish to use California's phase II reformulated gasoline. EPA has observed that gasoline with lower volatility corresponds to slightly higher fuel temperatures during driving. EPA therefore believes that using a fuel such as California phase II reformulated gasoline, which has a lower volatility than that of federal test fuel, would not sacrifice test stringency. The new regulatory language is intended to allow use of California's specified test fuel, even though other parameters besides volatility fall outside the federal test fuel specifications.

EPA will also accept demonstration of compliance with the fuel tank pressure requirement using California phase II reformulated gasoline. Using this fuel will cause somewhat lower fuel tank pressures, which makes it easier to comply with the pressure limit. EPA believes this is acceptable for a combination of reasons. First, vehicles tested on a dynamometer to certify compliance with evaporative emission standards will also demonstrate compliance with the fuel tank pressure requirement, but with federal fuel. Also, because EPA may conduct its own testing to measure pressure during outdoor driving, manufacturers have no incentive to take advantage of the lower volatility fuel to comply with the fuel tank pressure requirement.

30. Change speed measurement accuracy to ± 1 mph:

—Conventional equipment for measuring speeds during outdoor driving cannot resolve speeds to the ±0.1 mph tolerance originally specified. Relaxing the accuracy to ±1 mph would enable manufacturers to use existing equipment and will not affect the validity of the fuel temperature profiles.

31. Allow fuel heating/stabilization up to 95±3° F before drive:

—The regulations will continue to allow a 12-hour soak before starting the outdoor drive, with no control of the fuel temperature during that time. However, the regulations now include a provision to stabilize fuel temperatures in a temperature-controlled environment before the drive. When vehicles are stabilized in this way, manufacturers are expected to attempt to start outdoor vehicle operation with fuel temperatures at the nominal temperature of 95° F. Manufacturers may need to take steps to isolate the fuel tank from the pavement or other heat sources and to begin the test drive as soon as possible after exiting the enclosure.

32. Specify 125° F as minimum pavement temperature throughout the outdoor drive:

—EPA has learned that the requirement for pavement temperatures staying 30° F above ambient was sometimes difficult to meet, because pavement temperatures might not increase fast enough to stay 30° F ahead of increasing ambient temperatures. Since fuel temperature is limited to a nominal starting point of 95° F, fixing the minimum pavement temperature at 125° F satisfies EPA's desire to keep the pavement temperature at least 30° F above the initial fuel temperature.

33. Allow rolling fuel temperature profiles:

—New language clarifies that manufacturers may use a rolling average to derive fuel temperature profiles for testing.

34. Add general provision for hot wind tunnel approach to generating temperature profiles:

—See Section II above.

35. Add provision to allow temporary wind gusts:

—Originally, wind speed was limited to a maximum of 15 mph throughout the period of outdoor driving. EPA would like to avoid invalidating a test run for occasional gusts of wind exceeding the 15 mph limit, since fuel temperature profiles should be unaffected. To accommodate such a situation, the regulations now allow wind speeds between 15 and 25 mph for up to 5 percent of the total driving time.

36. Allow small-volume manufacturers to use alternate methods to generate profiles:

—EPA realizes that small-volume manufacturers may not have the resources to conduct a full test program according to the prescribed procedure to establish fuel temperature profiles for their vehicles. These manufacturers may use other means to generate fuel temperature profiles, though EPA expects such profiles to be at least as stringent as those that would be generated according to the full set of specifications for outdoor testing.

37. Allow the possibility of alternate methodologies for correcting fuel temperature profiles:

—One issue EPA has not resolved with manufacturers is the method of correcting measured fuel temperature profiles to create a target profile for running loss testing. EPA has agreed to add language to the regulations allowing an alternate correction methodology, subject to prior Agency approval. This change provides EPA the discretion to accommodate a future resolution without requiring a subsequent change to the regulations.

Spitback Test

38. Change refueling rate to 9.8±0.3 gallons per minute:

—The changed refueling rate matches that used for the refueling emission test. Specifying consistent refueling rates allows use of the same equipment for the two procedures.

39. Allow vehicle to be moved across lab with engine off:

—Safety regulations at some facilities prevent driving a test vehicle from the dynamometer to the refueling site. The test procedure therefore now includes an allowance for moving the vehicle with the engine off, without changing the time constraints.

40. Add time specification for the period between the end of the drive and the start of refueling (not just key-off):

—This time specification was missing from the original test procedure.

Equipment Calibration

41. Add the option to use alternate calibration data:

—The regulations have been modified to allow alternate calibration techniques that are acceptable to EPA. Under the modified regulations, EPA would approve use of the calibration methods currently required by CARB for demonstrating compliance with equipment specifications for federal testing.

42. Add the option to use new calibration procedures for pre-1996 testing:

—Manufacturers may use their upgraded facilities to continue testing according to the test procedure specified in § 86.130–78.

Miscellaneous

43. Allow limited subtraction of nonfuel background emissions for certification vehicles:

—For certification vehicles only, manufacturers may conduct testing on individual vehicles to quantify nonfuel background levels. Testing must indicate the expected decay rate of the nonfuel emissions. In addition manufacturers must indicate the primary source of the measured nonfuel emissions. EPA will not approve use of a correction for nonfuel emissions if (1) the emissions cannot be accounted for, (2) the source can be easily removed, or (3) the rate of decay indicates a significant potential for increased in-use emissions.

This change is consistent with EPA's long-standing position that nonfuel background emissions should be included in testing for evaporative emissions. By making no provision to treat nonfuel emissions separately for in-use vehicles, EPA maintains this fundamental position. EPA believes that the provision for special treatment of some certification vehicles gives manufacturers some flexibility to simplify vehicle selection and preparation, without compromising EPA's expectation that manufacturers prevent nonfuel emissions from constituting a significant source of in-use emissions. Moreover, EPA still expects manufacturers routinely to take basic steps to minimize nonfuel emissions from certification vehicles, for example, to use weathered vehicles.

44. Allow continuous measurement of evaporative emissions (hydrocarbon only):

—At various points through the procedure, the language has been revised to allow continuous emission measurement, rather than just testing at the beginning and end of a sampling period. Continuous measurement would make it possible to terminate a test, without making it invalid, if the vehicle has exceeded the standard well before the end of the test.

45. Remove obsolete sections from the Code of Federal Regulations (CFR):

—Sections of title 40 part 86 of the CFR that affect only 1990 model year and older vehicles will not be printed in future CFR publications.

46. Change from ''alternate sampling systems'' to ''alternate equipment or procedures'':

—The revised language clarifies the meaning of this provision in § 86.106–96.

47. Add simplified calculation for variable-volume enclosures for diurnal emission testing:

—Variable volume enclosures trap a fixed mass of air for the duration of the test; therefore, the ideal gas law dictates that the ratio of PV/T must remain constant during the test. Carrying this assumption into the calculation of mass emissions allows one to omit separate determination at the end of the test of pressure, temperature, and volume in the enclosure.

48. Revise the equation for calculating the mass of methanol emissions:

—The equation is simplified by eliminating the explicit temperature correction for the enclosure volume (V_n) and sample volume (V_e), and instead requires that the sample volumes be corrected for changes in temperature, to be consistent with V_n, prior to being used in the equation.

Refueling Emission Test

49. Allow road-speed modulated fan during vehicle operation:

—EPA would like to allow the same road-speed modulated fans for engine cooling during the refueling emission test that are specified for the running loss test. Because these fans provide a better simulation of on-road air cooling, the test vehicle's hood should be closed during testing with these fans. If one continues to rely on the conventional fixed-speed cooling fan, the test vehicle's hood should be left open to increase the capacity for engine cooling.

IV. Public Participation and Effective Date

To prepare this final rule, EPA has worked actively with CARB and the automobile manufacturers to reach a resolution on the many issues involved. EPA twice distributed draft regulatory language for review and met periodically with interested participants. EPA benefitted greatly from this extensive interaction, so that the resulting set of changes to the test procedure, reflecting this broad input, will significantly improve EPA's and manufacturers' ability to conduct testing more efficiently.

The Agency is publishing this action as a direct final rule because it views the changes as not affecting test stringency and anticipates no adverse or critical comments. This action will become effective unless the Agency receives notice that adverse or critical comments will be submitted, or that a party requests the opportunity to submit such oral comments pursuant to section 307(d)(5) of the Clean Air Act, as amended. If such notice is received regarding a change to a particular regulatory provision by September 22, 1995, EPA will withdraw the provision in question before the effective date by publishing a subsequent **Federal Register** document removing the identified provision from the direct final rule.

V. Paperwork Reduction Act

EPA is amending the table of currently approved information collection request (ICR) control numbers issued by the Office of Management and Budget (OMB) for various regulations. The amendments in this document update the table to accurately display those information requirements promulgated under the Evaporative Emissions Final Rule (March 24, 1993, 58 FR 16002). The affected regulations are codified at 40 CFR part 86, subpart A. EPA will continue to present OMB control numbers in a consolidated table format to be codified in 40 CFR part 9 and in each CFR volume containing EPA regulations. The table lists the section numbers with reporting and recordkeeping requirements, and the current OMB control numbers. This display of the OMB control number and its subsequent codification in the Code of Federal Regulations satisfies the requirements of the Paperwork Reduction Act (44 U.S.C. 3501 et seq.) and OMB's implementing regulations at 5 CFR part 1320.

This ICR was subject to public notice and comment prior to OMB approval. As a result, EPA finds that there is ''good cause'' under section 553(b)(B) of the Administrative Procedures Act (5 U.S.C. 553(b)(B)) to amend this table without additional notice and comment. Due to the technical nature of the table, further notice and comment would be unnecessary.

VI. Administrative Designation

Pursuant to Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether a regulatory action is ''significant'' and therefore subject to OMB review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, the Agency has determined that this direct final rule is not a ''significant regulatory action.''

VII. Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 requires federal agencies to examine significant adverse impacts of federal regulations on a substantial number of small entities. The Agency believes that the changes to the test requirements published in this final action are unlikely to have a significant economic impact on a substantial number of small entities. In fact, the revisions expand the flexibility of small businesses required to comply with existing regulations.

VIII. Unfunded Mandates Act

Under section 202 of the Unfunded Mandates Reform Act of 1995, EPA must prepare a budgetary impact statement to accompany any proposed or final rule that includes a federal mandate with estimated costs to the private sector of $100 million or more, or to state, local, or tribal governments of $100 million or more in the aggregate. Under section 205, EPA must select the most cost-effective and least burdensome alternative that achieves the objectives of the rule and is consistent with statutory requirements. Section 203 requires EPA to establish a plan for informing and advising any small governments that may be significantly or uniquely impacted by the rule.

EPA has determined that this direct final rule imposes no new federal requirements and therefore does not include any federal mandate with costs to the private sector or to state, local, or tribal governments.

IX. Judicial Review

Under section 307(b) of the Clean Air Act, EPA hereby finds that these regulations are of national applicability. Accordingly, judicial review of this action is available only by filing a petition for review in the United States Court of Appeals for the District of Columbia Circuit within 60 days of publication. Under section 307(b)(2) of the Act, the requirements that are the subject of this document may not be challenged later in judicial proceedings brought by EPA to enforce these requirements.

List of Subjects

40 CFR Part 9

Reporting and recordkeeping requirements.

40 CFR Part 86

Environmental protection, Administrative practice and procedures, Air pollution control, Confidential business information, Gasoline, Incorporation by reference, Labeling, Motor vehicle pollution, Motor vehicles, Reporting and recordkeeping requirements.

40 CFR Part 600

Administrative practice and procedures, Electric power, Energy conservation, Fuel economy, Gasoline, Labeling, Motor vehicles, Reporting and recordkeeping requirements.

Dated: July 6, 1995.

Carol M. Browner,

Administrator.

For the reasons set out in the preamble, title 40, chapter I, parts 9 and 86 of the Code of Federal Regulations, are amended as set forth below.

PART 9—[AMENDED]

1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 et seq., 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 et seq., 1311, 1313d, 1314, 1321, 1326, 1330, 1344, 1345 (d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 et seq., 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

2. Section 9.1 is amended by removing from the table entries 86.078–7, 86.082–14, 86.084–5, 86.084–14, 86.084–26, 86.085–8—86.085–9, 86.085–21—86.085–25, 86.085–27—86.085–30, 86.085–35, 86.085–37—86.085–38, 86.087–21, 86.087–23, 86.087–25, 86.087–28, 86.087–30, 86.087–35, 86.088–21, 86.088–23, 86.088–25, 86.088–28, 86.088–30, 86.088–35, 86.090–7, 86.090–14—86.090–15, 86.090–23, 86.090–25—86.090–28, 86.090–30, 86.142–82, 86.144–78, 86.537–78, 86.542–78, 86.1310–84, 86.1310–88, 86.1335–84, 86.1341–84, 86.1342–84, 86.1344–84, 86.1344–88 and by adding new entries in numerical order under the indicated heading to read as follows:

§ 9.1 OMB approvals under the Paperwork Reduction Act.

* * * * *

40 CFR citation	OMB control No.
* * * * *	
Control of Air Pollution From New and In-Use Motor Vehicles and New and In-Use Motor Vehicle Engines: Certification and Test Procedures	
* * * * *	
86.085–37	2060–0104
* * * * *	
86.090–14	2060–0104
* * * * *	
86.090–25	2060–0104
86.090–26	2060–0104
86.090–27	2060–0104
* * * * *	
86.096–7	2060–0104
86.096–10	2060–0104
86.096–14	2060–0104
86.096–26	2060–0104
86.096–30	2060–0104
86.099–10	2060–0104
* * * * *	

PART 86—[AMENDED]

3. The authority citation for part 86 continues to read as follows:

Authority: Secs. 202, 203, 205, 206, 207, 208, 215, 216, 217, and 301(a), Clean Air Act, as amended (42 U.S.C. 7521, 7522, 7524, 7525, 7541, 7542, 7549, 7550, 7552, and 7601(a)).

4. Part 86 is amended by removing the following sections: 86.078–7, 86.081–8, 86.082–8, 86.082–14, 86.083–30, 86.084–5, 86.084–14, 86.084–15, 86.084–26, 86.085–8, 86.085–9, 86.085–10, 86.085–11, 86.085–21, 86.085–22, 86.085–23, 86.085–24, 86.085–25, 86.085–27, 86.085–28, 86.085–29, 86.085–30, 86.085–35, 86.085–38, 86.087–8, 86.087–9, 86.087–10, 86.087–21, 86.087–23, 86.087–25, 86.087–28, 86.087–29, 86.087–30, 86.087–35, 86.088–9, 86.088–11, 86.088–21, 86.088–23, 86.088–25, 86.088–28, 86.088–29, 86.088–30, 86.088–35, 86.090–7, 86.090–10, 86.090–11, 86.090–15, 86.090–23, 86.090–28, 86.090–29, 86.090–30, 86.090–35, 86.106–82, 86.109–82, 86.110–82, 86.111–82, 86.112–82, 86.116–82, 86.119–78, 86.126–78, 86.139–82, 86.142–82, 86.144–78, 86.401–78, 86.410–78, 86.509–78, 86.511–78,

86.513–82, 86.516–78, 86.521–78, 86.526–78, 86.527–78, 86.535–78, 86.537–78, 86.540–78, 86.542–78, 86.544–78, 86.1309–84, 86.1310–84, 86.1310–88, 86.1311–84, 86.1335–84, 86.1341–84, 86.1342–84, 86.1344–84, 86.1344–88, 86.1501–84, 86.1504–84, 86.1506–84, 86.1513–84, 86.1513–87.

5. Section 86.1 is amended by adding paragraph (b)(4) to read as follows:

§ 86.1 Reference materials.

* * * * *

(b) * * *

(4) *California regulatory requirements.* The following table sets forth California regulatory requirements that have been incorporated by reference. The first column lists the name and date of the material. The second column lists the sections of the part, other than § 86.1, in which the matter is referenced. The second column is presented for information only and may not be all-inclusive. Copies of these materials may be obtained from U.S. EPA, Office of Air and Radiation, 401 M Street, S.W., Washington, DC 20460.

Document No. and name	40 CFR part 86 reference
California Regulatory Requirements Applicable to the Evaporative Emissions Program, January 4, 1995.	86.096–8; 86.096–9; 86.096–10.

Subpart A—[Amended]

6. Section 86.096–8 of subpart A is amended by revising paragraph (b) introductory text and adding paragraph (b)(5)(iv) to read as follows:

§ 86.096–8 Emission standards for 1996 and later model year light-duty vehicles.

* * * * *

(b) Evaporative emissions from light-duty vehicles shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

(5) * * *

(iv) For the 1996 model year, manufacturers may satisfy the testing requirements for federal certification to the evaporative standards of paragraph (b) of this section, except the fuel dispensing spitback test, by presenting test results from the certification procedures defined by the California Regulatory Requirements Applicable to the Evaporative Emissions Program (January 4, 1995). These requirements have been incorporated by reference (see § 86.1).

* * * * *

7. Section 86.096–9 of subpart A is amended by revising paragraphs (b) introductory text and (c) through (k), and adding paragraph (b)(5)(iv) to read as follows:

§ 86.096–9 Emission standards for 1996 and later model year light-duty trucks.

* * * * *

(b) Evaporative emissions from light-duty trucks shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

(5) * * *

(iv) For the 1996 model year, manufacturers may satisfy the testing requirements for federal certification to the evaporative standards of paragraph (b) of this section, except the fuel dispensing spitback test, by presenting test results from the certification procedures defined by the California Regulatory Requirements Applicable to the Evaporative Emissions Program (January 4, 1995). These requirements have been incorporated by reference (see § 86.1).

(c) [Reserved]. For guidance see § 86.094–9.

(d) through (f) [Reserved].

(g) through (k) [Reserved]. For guidance see § 86.094–9.

8. Section 86.096–10 of subpart A is amended by revising paragraph (b) introductory text and adding paragraph (b)(5)(iv) to read as follows:

§ 86.096–10 Emission standards for 1996 and later model year Otto-cycle heavy-duty engines and vehicles.

* * * * *

(b) Evaporative emissions from heavy-duty vehicles shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

(5) * * *

(iv) For the 1996 model year, manufacturers may satisfy the testing requirements for federal certification to the evaporative standards of paragraph (b) of this section, except the fuel dispensing spitback test, by presenting test results from the certification procedures defined by the California Regulatory Requirements Applicable to the Evaporative Emissions Program (January 4, 1995). These requirements have been incorporated by reference (see § 86.1).

* * * * *

9. Section 86.096–11 of subpart A is amended by revising paragraph (b)(5)(i) to read as follows:

§ 86.096–11 Emission standards for 1996 and later model year diesel heavy-duty engines and vehicles.

* * * * *

(b) * * *

(5)(i) For vehicles with a Gross Vehicle Weight Rating of up to 26,000 lbs, the standards set forth in paragraphs (b)(3) and (b)(4) of this section refer to a composite sample of evaporative emissions collected under the conditions and measured in accordance with the procedures set forth in subpart M of this part. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

10. Section 86.098–7 of subpart A is amended by adding paragraphs (h)(1) through (h)(5) to read as follows:

§ 86.098–7 Maintenance of records; submittal of information; right of entry.

* * * * *

(h)(1) through (h)(5) [Reserved]. For guidance see § 86.094–7.

* * * * *

11. Section 86.098–11 of subpart A is amended by revising paragraph (b)(3)(iii)(A) to read as follows:

§ 86.098–11 Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.

* * * * *

(b) * * *

(3) * * *

(iii)(A) For vehicles with a Gross Vehicle Weight Rating of up to 26,000 lbs, the standards set forth in paragraph (b)(3) of this section refer to a composite sample of evaporative emissions collected under the conditions and measured in accordance with the procedures set forth in subpart M of this part. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

12. Section 86.098–26 is amended by removing paragraphs (a)(3)(i)(B) through (a)(3)(ii)(B) and adding paragraphs (a)(3)(i)(D) through (a)(3)(ii)(B) to read as follows:

§ 86.098–26 Mileage and service accumulation; emission measurements.

* * * * *

(a)(3)(i)(D) through (a)(3)(ii)(B) [Reserved]. For guidance see § 86.094–26.

* * * * *

13. Section 86.099–8 of subpart A is amended by revising paragraph (b) introductory text to read as follows:

§ 86.099–8 Emission standards for 1999 and later model year light-duty vehicles.

* * * * *

(b) Evaporative emissions from light-duty vehicles shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

14. Section 86.099–9 of subpart A is amended by revising paragraph (b) introductory text to read as follows:

§ 86.099–9 Emission standards for 1999 and later model year light-duty trucks.

* * * * *

(b) Evaporative emissions from light-duty trucks shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

15. Section 86.099–10 of subpart A is amended by revising paragraph (b) introductory text to read as follows:

§ 86.099–10 Emission standards for 1999 and later model year Otto-cycle heavy-duty engines and vehicles.

* * * * *

(b) Evaporative emissions from heavy-duty vehicles shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

16. Section 86.099–11 of subpart A is amended by revising paragraph (b)(3)(iii)(A) to read as follows:

§ 86.099–11 Emission standards for 1999 and later model year diesel heavy-duty engines and vehicles.

* * * * *

(b) * * *

(3) * * *

(iii)(A) For vehicles with a Gross Vehicle Weight Rating of up to 26,000 lbs, the standards set forth in paragraph (b)(3) of this section refer to a composite sample of evaporative emissions collected under the conditions and measured in accordance with the procedures set forth in subpart M of this part. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

* * * * *

Subpart B—[Amended]

17. Section 86.106–96 of subpart B is amended by revising paragraph (a) introductory text to read as follows:

§ 86.106–96 Equipment required; overview.

(a) This subpart contains procedures for exhaust emission tests on petroleum-fueled, natural gas-fueled, liquefied petroleum gas-fueled, and methanol-fueled light-duty vehicles and light-duty trucks, and for evaporative emission tests on gasoline-fueled, natural gas-fueled, liquefied petroleum gas-fueled, and methanol-fueled light-duty vehicles and light-duty trucks. Certain items of equipment are not necessary for a particular test, e.g., evaporative enclosure when testing petroleum-fueled diesel vehicles. Alternate equipment, procedures, and calculation methods may be used if shown to yield equivalent or superior results, and if approved in advance by the Administrator. Equipment required and specifications are as follows:

* * * * *

18. Section 86.107–96 of subpart B is amended by revising paragraphs (a)(1) introductory text, (a)(1)(ii)(A), (a)(1)(ii)(B), (a)(2), (a)(3)(i), (a)(3)(ii), (c)(1), (d), (e), and (f) to read as follows:

§ 86.107–96 Sampling and analytical systems; evaporative emissions.

(a) *Testing enclosures*—(1) *Diurnal emission test.* The enclosure shall be readily sealable, rectangular in shape, with space for personnel access to all sides of the vehicle. When sealed, the

enclosure shall be gas tight in accordance with § 86.117–96. Interior surfaces must be impermeable and nonreactive to hydrocarbons (and to methanol, if the enclosure is used for methanol-fueled vehicles). The temperature conditioning system shall be capable of controlling the internal enclosure air temperature to follow the prescribed temperature versus time cycle as specified in § 86.133–96 and Appendix II of this part, within an instantaneous tolerance of ±3.0° F of the nominal temperature versus time profile throughout the test, and an average tolerance of 2.0° F over the duration of the test (where the average is calculated using the absolute value of each measured deviation). The control system shall be tuned to provide a smooth temperature pattern that has a minimum of overshoot, hunting, and instability about the desired long-term ambient temperature profile. Interior surface temperatures shall not be less than 40° F at any time during the diurnal emission test. To accommodate the volume changes due to enclosure temperature changes, either a variable-volume or fixed-volume enclosure may be used for diurnal emission testing:

* * * * *

(ii) *Fixed-volume enclosure.* * * *

(A) The enclosure shall be equipped with a mechanism to maintain a fixed internal air volume. This may be accomplished either by withdrawing air at a constant rate and providing makeup air as needed, or by reversing the flow of air into and out of the enclosure in response to rising or falling temperatures. If inlet air is added continuously throughout the test, it should be filtered with activated carbon to provide a relatively low and constant hydrocarbon level. Any method of volume accommodation shall maintain the differential between the enclosure internal pressure and the barometric pressure to a maximum value of ±2.0 inches of water.

(B) The equipment shall be capable of measuring the mass of hydrocarbon and methanol (if the enclosure is used for methanol-fueled vehicles) in the inlet and outlet flow streams with a resolution of 0.01 gram per hour. A bag sampling system may be used to collect a proportional sample of the air withdrawn from and admitted to the enclosure. Alternatively, the inlet and outlet flow streams may be continuously analyzed using an on-line FID analyzer and integrated with the flow measurements to provide a continuous record of the mass hydrocarbon and methanol removal.

(2) *Running loss test.* The enclosure shall be readily sealable, rectangular in shape, with space for personnel access to all sides of the vehicle. When sealed, the enclosure shall be gas tight in accordance with § 86.117–96. The enclosure may be equipped with a personnel door, provided that the enclosure can still meet the requirements of § 86.117–96 with the door installed. Interior surfaces must be impermeable and nonreactive to hydrocarbons and to methanol (if the enclosure is used for methanol-fueled vehicles). Interior surface temperatures shall not be less than 40° F. If a running loss enclosure meets all the requirements of paragraph (a)(1) of this section, it may be used as a diurnal evaporative emission enclosure. The enclosure must contain a dynamometer that meets the requirements of § 86.108. Provisions shall be made to remove exhaust gases from the enclosure. During the running loss test, ambient temperatures must be maintained at 95±5° F (95±2° F on average). An air or oxygen cylinder with an attached self-contained breathing apparatus may be provided for the vehicle operator. The air required for vehicle operation shall be provided by one of the following methods:

(i) The running loss enclosure may be equipped to supply air to the vehicle, at a temperature of 95±5° F, from sources outside of the running loss enclosure directly into the operating engine's air intake system. Supplemental air requirements (e.g., for an air pump) shall be supplied by drawing air from the engine intake source.

(ii) If it is shown to yield equivalent or superior results, the running loss enclosure may be designed with an air makeup system that brings outside air into the enclosure to accommodate the aspiration needs of the engine and any auxiliary devices. The makeup air shall be monitored to establish the background hydrocarbon levels (or hydrocarbon and methanol, levels, if applicable) of the makeup air. A filter may be used to provide dry air with a stable concentration of background hydrocarbon. The makeup-air vent shall be readily sealable for calibration of the enclosure and other purposes. For calculation of running loss emissions, it may be assumed that the hydrocarbon and methanol concentration in the air consumed by the vehicle is the same as that of the rest of the air in the enclosure.

(3) *Hot soak test.* * * *

(i) If the hot soak test is conducted in the same enclosure as the immediately preceding running loss test, interior surface temperatures shall not be below 70° F for the last 55 minutes of the hot soak test.

(ii) If the hot soak test is not conducted in the same enclosure as the immediately preceding running loss test, interior surface temperatures shall not be below 70° F for the duration of the hot soak test.

* * * * *

(c) *Evaporative emission hydrocarbon and methanol data recording system.*

(1) The electrical output of the FID used for measuring hydrocarbons (or hydrocarbons plus methanol, as appropriate) shall be recorded at least at the initiation and termination of each running loss and hot soak test, and at least at the initiation and termination of the enclosure sampling period(s) for the diurnal emission test, as described in § 86.133. The recording may be taken by means of a strip chart potentiometric recorder, by use of an on-line computer system or other suitable means. In any case, the recording system must have operational characteristics (signal-to-noise ratio, speed of response, etc.) equivalent to or better than those of the signal source being recorded, and must provide a permanent record of results. The record shall show a positive indication of the initiation and completion of each hot soak, running loss, or diurnal emission test (including initiation and completion of sampling period(s)), along with the time elapsed during each soak.

* * * * *

(d) *Fuel temperature control system.* Fuel temperatures of the test vehicle shall be controlled, as specified in § 86.134(g)(1)(xv), with the following combination of fans. The control system shall be tuned and operated to provide a smooth and continuous fuel temperature profile that is representative of the on-road temperature profile. The running loss test configuration should be designed to avoid heating or cooling the fuel tank's vapor space in a way that would cause vapor temperature behavior to be unrepresentative of the vehicle's on-road profile.

(1) A vehicle cooling fan shall discharge air to the front of the vehicle. The fan shall be a road-speed modulated fan that is controlled to a discharge velocity that follows the dynamometer roll speed, at least up to speeds of 30 mph, throughout the driving cycle. If a warning light or gauge indicates that the vehicle's engine coolant has overheated, subsequent test runs on the vehicle must include a vehicle cooling fan that follows the dynamometer roll speed at all speeds throughout the test cycle. The fan may direct airflow to both the

vehicle radiator air inlet(s) and the vehicle underbody.

(2) An additional fan may be used to discharge airflow from the front of the vehicle directly to the vehicle underbody to control fuel temperatures. Such a fan shall provide a total discharge airflow not to exceed 8,000 cfm.

(3) Additional fans may be used to route heating or cooling air directly at the bottom of the vehicle's fuel tank. The air supplied to the tank shall be between 85° and 160° F, with a total discharge airflow not to exceed 4,000 cfm. For exceptional circumstances, manufacturers may direct up to 6,000 cfm at the bottom of the fuel tank with the advance approval of the Administrator.

(4) Direct fuel heating may be needed for canister preconditioning, as specified in § 86.132(j)(2). Also, under exceptional circumstances in which airflow alone is insufficient to control fuel temperatures during the running loss test, direct fuel tank heating may be used (see § 86.134–96(g)(1)(xv)). The heating system must not cause hot spots on the tank wetted surface that could cause local overheating of the fuel. Heat must not be applied directly to the tank's vapor space, nor to the liquid-vapor interface.

(e) *Temperature recording system.* A strip chart potentiometric recorder, an on-line computer system, or other suitable means shall be used to record enclosure ambient temperature during all evaporative emission test segments, as well as vehicle fuel tank temperature during the running loss test. The recording system shall record each temperature at least once every minute. The recording system shall be capable of resolving time to ±15 s and capable of resolving temperature to ±0.75° F (±0.42° C). The temperature recording system (recorder and sensor) shall have an accuracy of ±3° F (±1.7° C). The recorder (data processor) shall have a time accuracy of ±15 s and a precision of ±15 s. Enclosures shall be equipped with two ambient temperature sensors, connected to provide one average output, located 3 feet above the floor at the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall. For diurnal emission testing, an additional temperature sensor shall be located underneath the vehicle to provide a temperature measurement representative of the air temperature under the fuel tank. For running loss testing, an ambient temperature sensor shall be located at the inlet to the fan that provides engine cooling. Manufacturers shall arrange that vehicles furnished for testing at federal certification facilities be equipped with temperature sensors for measurement of fuel tank temperatures. Vehicles shall be equipped with two temperature sensors installed to provide an average liquid fuel temperature. The temperature sensors shall be placed to measure the temperature at the mid-volume of the liquid fuel at a fill level of 40 percent of nominal tank capacity. An additional temperature sensor may be placed to measure vapor temperatures approximately at the mid-volume of the vapor space, though measurement of vapor temperatures is optional during the running loss test. In-tank temperature sensors are not required for the supplemental two-diurnal test sequence specified in § 86.130–96.

(f) *Pressure recording system.* A strip chart potentiometric recorder, an on-line computer system, or other suitable means, shall be used to record the enclosure gage pressure for any testing in an enclosure, as well as the vehicle's fuel tank pressure during the running loss test and the outdoor driving procedure specified in § 86.129–94(d). Fuel tank pressure measurement and recording equipment are optional during the running loss test. The recording system shall record each pressure at least once every minute. The recording system shall be capable of resolving time to ±15 s and capable of resolving pressure to ±0.1 inches of water. The pressure recording system (recorder and sensor) shall have an accuracy of ±1.0 inch of water. The recorder (data processor) shall have a time accuracy of ±15 s and a precision of ±15 s. The pressure transducer shall be installed to measure the pressure in the vapor space of the fuel tank.

* * * * *

19. Section 86.107–98 of subpart B is amended by revising paragraph (e)(1) to read as follows:

§ 86.107–98 Sampling and analytical system.

* * * * *

(e) *Temperature recording system*—(1) *For all emission testing.* A strip chart potentiometric recorder, an on-line computer system, or other suitable means shall be used to record enclosure ambient temperature during all evaporative emission test segments, as well as vehicle fuel tank temperature during the running loss test. The recording system shall record each temperature at least once every minute. The recording system shall be capable of resolving time to ±15 s and capable of resolving temperature to ±0.75° F (±0.42° C). The temperature recording system (recorder and sensor) shall have an accuracy of ±3° F (±1.7° C). The recorder (data processor) shall have a time accuracy of ±15 s and a precision of ±15 s. Enclosures shall be equipped with two ambient temperature sensors, connected to provide one average output, located 3 feet above the floor at the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall. For diurnal emission testing, an additional temperature sensor shall be located underneath the vehicle to provide a temperature measurement representative of the temperature of the air under the fuel tank. For running loss testing, an ambient temperature sensor shall be located at the inlet to the fan that provides engine cooling. Manufacturers shall arrange that vehicles furnished for testing at federal certification facilities be equipped with temperature sensors for measurement of fuel tank temperature. Vehicles shall be equipped with 2 temperature sensors installed to provide an average liquid fuel temperature. The temperature sensors shall be placed to measure the temperature at the mid-volume of the liquid fuel at a fill level of 40 percent of nominal tank capacity. An additional temperature sensor may be placed to measure vapor temperatures approximately at the mid-volume of the vapor space, though measurement of vapor temperatures is optional during the running loss test. In-tank temperature sensors are not required for the supplemental two-diurnal test sequence specified in § 86.130–96 or for the refueling test specified in § 86.151–98.

* * * * *

20. Section 86.117–96 of subpart B is amended by revising the introductory text and paragraphs (a)(1)(ii), (a)(1)(iii), (a)(7), (b), (c) heading, (c)(1) introductory text, (c)(1)(iv), (c)(1)(v), (c)(1)(vii), (d)(1) introductory text and equation, (d)(1)(v), and (e)(1)(iii), adding paragraph (d)(3), and removing and reserving paragraphs (d)(1)(iii) and (d)(1)(iv) to read as follows:

§ 86.117–96 Evaporative emission enclosure calibrations.

The calibration of evaporative emission enclosures consists of three parts: initial and periodic determination of enclosure background emissions (hydrocarbons and methanol); initial determination of enclosure internal volume; and periodic hydrocarbon and methanol retention check and calibration. Methanol measurements may be omitted if methanol-fueled vehicles will not be tested in the evaporative enclosure. Alternate calibration methods may be used if

shown to yield equivalent or superior results, and if approved in advance by the Administrator; specifically, more extreme temperatures may be used for determining calibration without affecting the validity of test results.

(a) *Initial and periodic determination of enclosure background emissions.*
* * *

(1) * * *

(ii) Fixed-volume enclosures may be operated with inlet and outlet flow streams either closed or open; if inlet and outlet flow streams are open, the air flowing into and out of the enclosure must be monitored in accordance with § 86.107–96(a)(1)(ii)(B). Ambient temperatures shall be maintained at 96±3° F throughout the 4-hour period.

(iii) For running loss enclosures ambient temperatures shall be maintained at 95±3° F throughout the 4-hour period. For running loss enclosures designed with a vent for makeup air, the enclosure shall be operated with the vent closed.

* * * * *

(7) Allow the enclosure to stand undisturbed for four hours.

* * * * *

(b) *Initial determination of enclosure internal volume.* Prior to its introduction into service the enclosure internal volume shall be determined by the following procedure:

(1) Carefully measure the internal length, width and height of the enclosure, accounting for irregularities (such as braces) and calculate the internal volume. For variable-volume enclosures, latch the enclosure to a fixed volume when the enclosure is held at a constant temperature; this nominal volume shall be repeatable within ±0.5 percent of the reported value.

(2) [Reserved].

(3) [Reserved].

(c) *Hydrocarbon and methanol (organic gas) retention check and calibration.* * * *

(1) An enclosure to be used for the diurnal emission test (see § 86.133–96) shall be calibrated according to the following procedure. Calibration for hydrocarbon and methanol may be conducted simultaneously or in sequential test runs.

* * * * *

(iv) [Reserved].

(v) Turn on the ambient temperature control system (if not already on) and adjust it for an initial temperature of 96° F (36° C). On variable-volume enclosures, latch the enclosure to the appropriate volume position for the set temperature. On fixed-volume enclosures close the outlet and inlet flow streams.

* * * * *

(vii) Inject into the enclosure 2 to 6 grams of pure methanol at a temperature of at least 150° F (65° C) and/or 2 to 6 grams of pure propane. The injected quantity may be measured by volume flow or by mass measurement. The method used to measure the quantity of methanol and propane shall have an accuracy of ±0.2 percent of the measured value (less accurate methods may be used with the advance approval of the Administrator).

* * * * *

(d) *Calculations.* (1) The calculation of net methanol and hydrocarbon mass change is used to determine enclosure background and leak rate. It is also used to check the enclosure volume measurements. The methanol mass change is calculated from the initial and final methanol samples, the net withdrawn methanol (in the case of diurnal emission testing with fixed-volume enclosures), and initial and final temperature and pressure according to the following equation:

$$M_{CH_3OH} = V_n \times \left[\frac{\left(C_{MS1f} \times AV_{1f}\right) + \left(C_{MS2f} \times AV_{2f}\right)}{V_{E_f}}\right] - \left[\frac{\left(C_{MS1i} \times AV_{1i}\right) + \left(C_{MS2i} \times AV_{2i}\right)}{V_{E_i}}\right] + \left(M_{CH_3OH,out} - M_{CH_3OH,in}\right)$$

Where:

* * * * *

(iii) [Reserved].

(iv) [Reserved].

(v) V_E=Volume of sample withdrawn, ft^3. Sample volumes must be corrected for differences in temperature to be consistent with determination of V_n, prior to being used in the equation.

* * * * *

(3) For variable-volume enclosures, defined in § 86.107(a)(1)(i), the following simplified form of the hydrocarbon mass change equation may be used:

$$M_{HC} = \left(\frac{kP_B V_n \times 10^{-4}}{T}\right) \times \left[\left(C_{HC_f} - rC_{CH_3OH_f}\right) - \left(C_{HC_i} - rC_{CH_3OH_i}\right)\right]$$

(e) *Calibration of equipment for point-source testing of running losses.* * * *

(1) * * *

(iii) Operate the vapor sampling system in the normal manner and release a known quantity of pure propane into the most frequently used fuel vapor collector during the sampling period (approximately 5 minutes).

* * * * *

21. Section 86.129–94 of subpart B is amended by revising paragraphs (d)(1), (d)(2)(iii), (d)(3)(ii), (d)(3)(iii), (d)(4)(i), (d)(4)(ii), (d)(4)(iii), (d)(7)(iii), and (d)(7)(iv) and adding paragraph (d)(7)(v) to read as follows:

§ 86.129–94 Road load power, test weight, inertia weight class determination, and fuel temperature profile.

* * * * *

(d) *Fuel temperature profile*—(1) *General requirements.* (i) To be tested for running losses, as specified in § 86.134, a vehicle must have a fuel temperature profile. The following procedure is used to generate the fuel temperature profile, which serves as a target for controlling fuel temperatures during the running loss test. This profile represents the fuel temperature change that occurs during on-road driving. If a vehicle has more than one fuel tank, a profile shall be established for each tank. Manufacturers may also simultaneously generate a profile for vapor temperatures.

(ii) If a manufacturer uses a vehicle model to develop a profile to represent multiple models, the vehicle model selected must have the greatest expected fuel temperature increase during driving of all those models it represents. Also, manufacturers must select test vehicles

with any available vehicle options that increase fuel temperatures during driving (for example, any feature that limits underbody airflow).

(iii) Manufacturers may conduct testing to develop fuel temperature profiles in a laboratory setting, subject to approval by the Administrator. The laboratory facility should simulate outdoor testing to reproduce fuel and vapor temperature behavior over the specified driving schedule. The design of the laboratory facility should include consideration of any parameters that may affect fuel temperatures, such as solar loading, pavement heat, and relative wind velocities around and underneath the test vehicle. Indoor testing to develop the fuel temperature profiles must be conducted with little or no vehicle-specific adjustment of laboratory parameters. Manufacturers would need to maintain an ongoing demonstration of correlation between laboratory and outdoor measurement of fuel temperatures. Specifically, fuel temperatures and pressures from indoor driving should be at least as high as measured when driving outdoors according to the procedures described in this section.

(iv) Small-volume manufacturers, as defined in § 86.094–14(b)(1), may use an alternate method for generating fuel temperature profiles, subject to the approval of the Administrator.

(v) The Administrator may conduct testing to establish any vehicle's temperature profiles or to verify compliance with fuel tank pressure requirements.

(2) * * *

(iii) The data recording system described in paragraph (d)(2)(ii) of this section shall be capable of resolving time to ±1 s, capable of resolving temperature to ±2° F, capable of resolving pressure to ±1.0 inch of water, and capable of resolving speed to ±1 mph. The temperature and pressure signals shall be recorded at intervals of up to 1 minute; speed signals shall be recorded at intervals of up to 1 second.

(3) * * *

(ii) Wind conditions shall be calm to light with maximum wind speed of 15 mph. In the case of temporary gusting, wind speeds between 15 and 25 mph may occur for up to 5 percent of the total driving time without invalidating the data collection. Wind speed shall be measured and recorded in regular intervals of at least once per minute. Measure wind speed with the following requirements (based on *Federal Standard for Siting Meteorological Sensors at Airports*, FCM–S4–1987). The site should be relatively level, but small gradual slopes are acceptable. The sensor shall be mounted 30 to 33 feet (9 to 10 meters) above the average ground height within a radius of 500 feet (150 meters). The sensor height shall not exceed 33 feet, except as necessary to be at least 15 feet (5 meters) above the height of any obstruction (e.g. vegetation, buildings, etc.) within a 500 foot (150 meter) radius. An object is considered to be an obstruction if the included lateral angle from the sensor to the ends of the object is 10 degrees or more.

(iii) Road surface temperature shall be at least 125 °F throughout the driving period. Pavement temperature shall be measured and recorded in regular intervals of at least once per minute. The track temperature may be measured with an embedded sensor, a portable temperature probe, or an infrared pyrometer that can provide an accuracy of ±2 °F. Temperatures must be measured on a surface representative of the surface where the vehicle is driven.

* * * * *

(4) *Profile determination procedure.* (i) Drain the fuel tank(s) and fill with test fuel to the ''tank fuel volume'' defined in § 86.082–2. The test fuel should meet the specifications of § 86.113, except that fuel with a lower volatility may be used, subject to Administrator approval. Manufacturers using a lower volatility fuel must generate a vapor temperature profile for demonstrating compliance with the limit on fuel tank pressure during the running loss test (see § 86.134–96).

(ii) The vehicle shall be moved to the location where the data is to be collected. It may be driven a maximum distance of 5 miles and may also be transported by other means. The vehicle shall be stabilized by one of the following methods:

(A) The vehicle shall be parked for a minimum of 12 hours in an open area on a surface that is representative of the test road, without any artificial heating or cooling of the fuel. The orientation of the front of the vehicle during parking (e.g., N, SW, etc.) shall be documented.

(B) The vehicle may be soaked in a temperature-controlled environment to stabilize fuel temperatures. Before starting the drive, the vehicle shall be stabilized with fuel temperatures 95 ±3 °F for at least one hour. The fuel temperature may not exceed 98 °F at any time before the beginning of the driving schedule, during which only whole-vehicle heating and cooling may be used to control fuel temperatures. If a manufacturer uses the provisions of paragraph (d)(7)(v) of this section to establish a lower initial fuel temperature for the running loss test, the fuel in the test vehicle may not be stabilized at a temperature higher than the newly established initial fuel temperature.

(iii) Once the ambient conditions specified in paragraph (d)(3) of this section are met and the vehicle has been stabilized according to paragraph (d)(4)(ii) of this section, the vehicle's engine may be started. The vehicle's air conditioning system (if so equipped) shall be set to the ''normal'' air conditioning mode and adjusted to the minimum discharge air temperature and high fan speed. Vehicles equipped with automatic temperature controlled air conditioning systems shall be set to operate in ''automatic'' temperature and fan modes with the system set at 72 °F.

* * * * *

(7) * * *

(iii) If all these requirements are met, the following calculations shall be performed to determine a profile for liquid fuel temperatures and, if applicable, for vapor temperatures:

$T_{i,profile}=T_i-T_o$.

Where:

(A) $Ti_{,profile}$=the series of temperatures that comprise the relative temperature profile.

(B) T_i=the series of observed liquid fuel or vapor temperatures during the drive.

(C) T_o=the liquid fuel or vapor temperature observed at the start of the specified driving schedule.

(iv) The relative temperature profile consists of the set of temperatures at each 1-minute interval. If temperatures are sampled more frequently than once per minute, the temperature data points may represent a rolling average of temperatures sampled for up to one-minute intervals. If multiple valid test runs are conducted for any model, then all the collected data shall be used to calculate a composite profile, based on the average temperatures at each point. The absolute temperature profile is determined by adding 95 °F (35 °C) to each point of the relative profile. Other methodologies for developing corrected liquid fuel and vapor space temperature profiles may be used if demonstrated to yield equivalent results and approved in advance by the Administrator.

(v) Manufacturers may use a lower initial fuel temperature for the running loss test, if approved in advance by the Administrator. To demonstrate the need for such an adjustment, manufacturers would be expected to determine the maximum fuel temperature experienced by a vehicle during an extended park or after driving one UDDS cycle when exposed to the ambient conditions described in paragraph (d)(3) of this section. To use this provision,

manufacturers would have to show maximum fuel temperatures no greater than 92 °F.

22. Section 86.130–96 of subpart B is amended by revising figure B96–10 at the end of the section and adding paragraph (e) to read as follows:

§ 86.130–96 Test sequence; general requirements.

* * * * *

(e) If tests are invalidated after collection of emission data from previous test segments, the test may be repeated to collect only those data points needed to complete emission measurements. Compliance with emission standards may be determined by combining emission measurements from different test runs. If any emission measurements are repeated, the new measurements supersede previous values.

BILLING CODE 6560–50–P

Federal Test Procedure

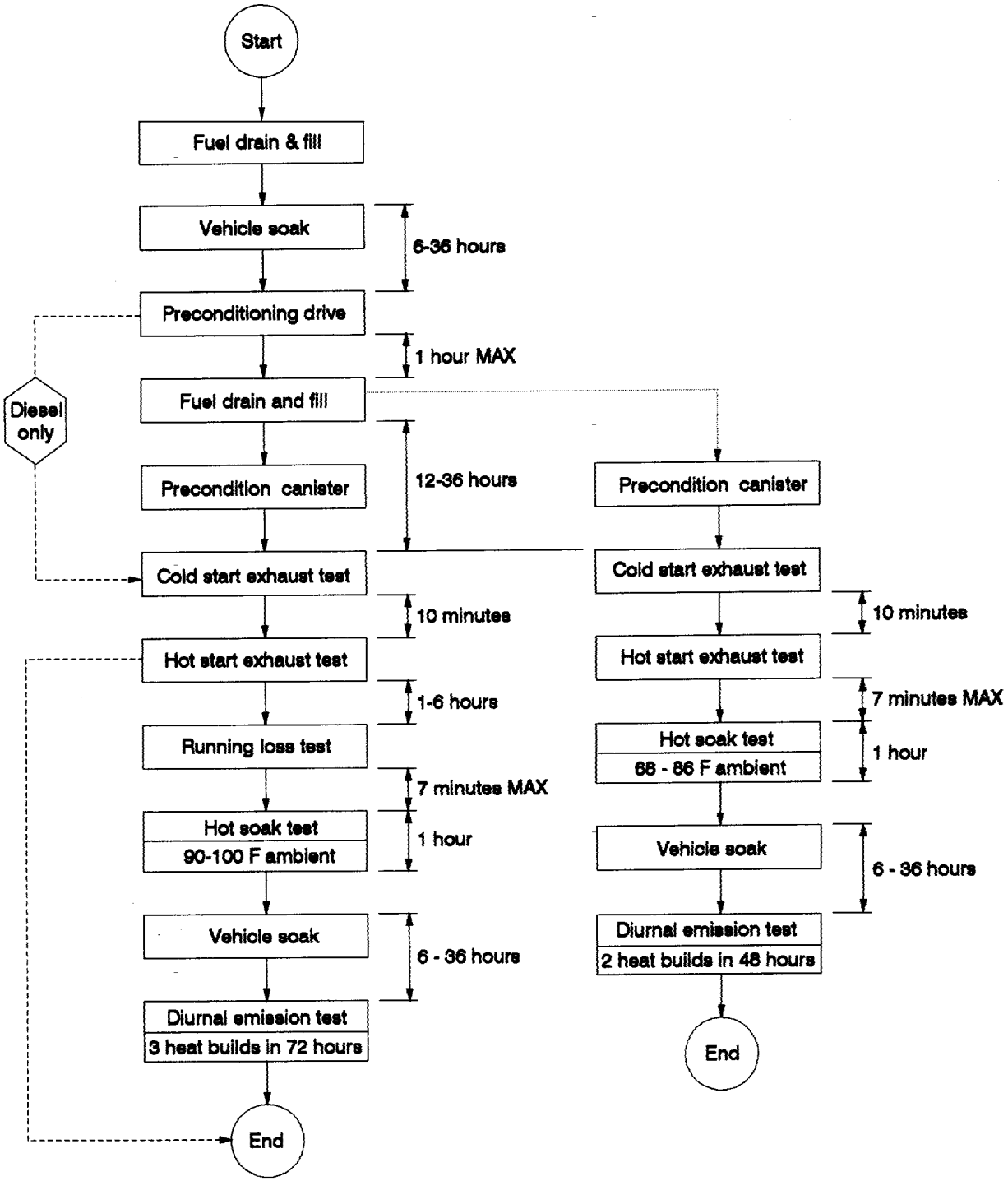

Figure B96-10 Test sequence

BILLING CODE 6560–50–C

23. Section 86.131–96 of subpart B is amended by revising paragraph (d) to read as follows:

§ 86.131–96 Vehicle preparation.

* * * * *

(d) For vehicles to be tested for running loss emissions, prepare the fuel tank(s) for measuring and recording the temperature and pressure of the fuel tank as specified in § 86.107–96 (e) and (f). Measurement of vapor temperature is optional during the running loss test. If vapor temperature is not measured, fuel tank pressure need not be measured.

* * * * *

24. Section 86.132–96 of subpart B is amended by revising paragraphs (c), (f), (h) introductory text, (h)(1)(i), (h)(2), (j) introductory text, (j)(1) introductory text, (j)(1)(i), and (j)(1)(vi) to read as follows:

§ 86.132–96 Vehicle preconditioning.

* * * * *

(c)(1) Gasoline- and methanol-fueled vehicles shall be soaked for at least 6 hours after being refueled. Petroleum-fueled diesel vehicles and gaseous-fueled vehicles shall be soaked for at least 1 hour after being refueled. Following this soak period, the test vehicle shall be placed, either by being driven or pushed, on a dynamometer and operated through one Urban Dynamometer Driving Schedule (UDDS), specified in § 86.115 and Appendix I of this part.

(2) Once a test vehicle has completed the refueling and vehicle soak steps specified in paragraphs (b) and (c)(1) of this section, these steps may be omitted in subsequent testing with the same vehicle and the same fuel specifications, provided the vehicle remains under laboratory ambient temperature conditions for at least 6 hours before starting the next test. In such cases, each subsequent test shall begin with the preconditioning drive specified in this paragraph. The test vehicle may not be used to set dynamometer horsepower.

* * * * *

(f)(1) *Gasoline- and methanol-fueled vehicles.* After completion of the preconditioning drive, the vehicle shall be driven off the dynamometer. The vehicle's fuel tank(s) shall be drained and then filled with test fuel, as specified in § 86.113, to the ''tank fuel volume'' defined in § 86.082–2. The vehicle shall be refueled within 1 hour after completion of the preconditioning drive. The fuel cap(s) shall be installed within 1 minute after refueling. The vehicle shall be parked within five minutes after refueling.

(2) *Petroleum-fueled diesel vehicles.* Within five minutes after completion after the preconditioning drive, the vehicle shall be driven off the dynamometer and parked.

(3) *Gaseous-fueled vehicles.* After completion of the preconditioning drive, the vehicle shall be driven off the dynamometer. Vehicle fuel tanks shall be refilled with fuel that meets the specifications in § 86.113. Fuel tanks shall be filled to a minimum of 75% of service pressure for natural gas-fueled vehicles or a minimum of 75% of available fill volume for liquefied petroleum gas-fueled vehicles. Prior draining of the fuel tanks is not called for if the fuel in the tanks already meets the specifications in § 86.113. The vehicle shall be parked within five minutes after refueling, or, in the absence of refueling, within five minutes after completion of the preconditioning drive.

* * * * *

(h) During the soak period for the three-diurnal test sequence described in § 86.130–96, evaporative canisters, if the vehicle is so equipped, shall be preconditioned according to the following procedure. For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel configuration, each canister must be preconditioned separately. If production evaporative canisters are equipped with a functional service port designed for vapor load or purge steps, the service port shall be used during testing to precondition the canister. In addition, for model year 1998 and later vehicles equipped with refueling canisters, these canisters shall be preconditioned for the three-diurnal test sequence according to the procedure in paragraph (j)(1) of this section. If a vehicle is designed to actively control evaporative or refueling emissions without a canister, the manufacturer shall devise an appropriate preconditioning procedure, subject to the approval of the Administrator.

(1)(i) Prepare the evaporative emission canister for the canister purging and loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step to avoid damage to the components and the integrity of the fuel system. A replacement canister may be temporarily installed during the soak period while the canister from the test vehicle is preconditioned.

* * * * *

(2) For methanol-fueled and flexible-fueled vehicles, canister preconditioning shall be performed with a fuel vapor composition representative of that which the vehicle would generate with the fuel mixture used for the current test. Manufacturers shall develop a procedure to precondition the evaporative canister, if the vehicle is so equipped, for the different fuel. The procedure shall represent a canister loading equivalent to that specified in paragraph (h)(1) of this section and shall be approved in advance by the Administrator.

* * * * *

(j) For the supplemental two-diurnal test sequence described in § 86.130–96, one of the following methods shall be used to precondition evaporative canisters during the soak period specified in paragraph (g) of this section. For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel configuration, each canister must be preconditioned separately. In addition, for model year 1998 and later vehicles equipped with refueling canisters, these canisters shall be preconditioned for the supplemental two-diurnal test sequence according to the procedure in paragraph (j)(1) of this section. Canister emissions are measured to determine breakthrough. Breakthrough is here defined as the point at which the cumulative quantity of hydrocarbons emitted is equal to 2 grams.

(1) *Butane loading to breakthrough.* The following procedure provides for emission measurement in an enclosure. Breakthrough may also be determined by measuring the weight gain of an auxiliary evaporative canister connected downstream of the vehicle's canister, in which case, the following references to the enclosure can be ignored. The auxiliary canister shall be well purged prior to loading. If production evaporative canisters are equipped with a functional service port designed for vapor load or purge steps, the service port shall be used during testing to precondition the canister.

(i) Prepare the evaporative/refueling emission canister for the canister loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be

taken during this step to avoid damage to the components and the integrity of the fuel system. A replacement canister may be temporarily installed during the soak period while the canister from the test vehicle is preconditioned.

* * * * *

(vi)(A) For gasoline-fueled vehicles, load the canister with a mixture composed of 50 percent butane and 50 percent nitrogen by volume at a rate of 40 grams butane per hour.

(B) For methanol-fueled and flexible-fueled vehicles, canister preconditioning shall be performed with a fuel vapor composition representative of that which the vehicle would generate with the fuel mixture used for the current test. Manufacturers shall develop a procedure to precondition the evaporative canister, if the vehicle is so equipped, for the different fuel.

* * * * *

25. Section 86.133–96 of subpart B is amended by revising paragraphs (c), (h), and (i)(5) to read as follows:

§ 86.133–96 Diurnal emission test.

* * * * *

(c) The test vehicle shall be exposed to ambient temperatures cycled according to the profile specified in § 86.133 and Appendix II of this part.

(1) Temperatures measured with the underbody temperature sensor shall follow the profile with a maximum deviation of 3° F at any time and an average temperature deviation not to exceed 2° F, where the average deviation is calculated using the absolute value of each measured deviation. In addition, the temperature from the sidewall temperature sensors shall follow the profile with a maximum deviation of 5° F at any time.

(2) Ambient temperatures shall be measured at least every minute. Temperature cycling shall begin when time=0 minutes, as specified in paragraph (i)(5) of this section.

* * * * *

(h) Prior to sampling for emissions and throughout the period of cycled ambient temperatures, the mixing fan(s) shall circulate the air at a rate of 0.8±0.2 cfm per cubic foot of ambient volume. The mixing fan(s), plus any additional fans if needed, shall also maintain a minimum wind speed of 5 mph (8 km/hr) under the fuel tank of the test vehicle. The Administrator may adjust fan speed and location to ensure sufficient air circulation around the fuel tank. The wind speed requirement may be satisfied by consistently using a fan configuration that has been demonstrated to maintain a broad 5-mph air flow in the vicinity of the vehicle's fuel tank, subject to verification by the Administrator.

(i) * * *

(5) Within 10 minutes of closing and sealing the doors, analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCi}, required in § 86.143. Hydrocarbon emissions may be sampled continuously during the test period.

* * * * *

26. Section 86.134–96 of subpart B is amended by revising paragraphs (a), (f), (g)(1)(v), (g)(1)(vii), (g)(1)(viii), (g)(1)(xii) introductory text, (g)(1)(xii)(A), (g)(1)(xiv), (g)(1)(xv), (g)(1)(xvi), (g)(2)(v), (g)(2)(vii), (g)(2)(x), and (g)(2)(xii) and adding paragraphs (g)(1)(xx)(C) and (g)(2)(xv) to read as follows:

§ 86.134–96 Running loss test.

(a) *Overview.* Gasoline- and methanol-fueled vehicles are to be tested for running loss emissions during simulated high-temperature urban driving; this test is not required for gaseous-fueled vehicles. During operation, tank temperatures are controlled according to a prescribed profile to simulate in-use conditions. If the vehicle is determined to have exceeded the standard before the end of the running loss test, the test may be terminated without invalidating the data. The test can be run either in a sealed enclosure or with the point-source method, as specified in paragraph (g) of this section. Measurement of vapor temperature is optional during the running loss test; however, if testing by the Administrator shows that a vehicle has exceeded an emission standard without measurement of vapor temperatures, the manufacturer may, utilizing its own resources, conduct subsequent testing on that vehicle to determine if the exceedance is attributable to inadequate control of vapor temperatures.

* * * * *

(f) *Temperature stabilization.* Immediately after the hot transient exhaust emission test, the vehicle shall be soaked in a temperature controlled area for a maximum of 6 hours until the fuel temperature is stabilized. The fuel may be heated or cooled to stabilize fuel temperatures, but the fuel heating rate must not exceed 5° F in any 1-hour interval during the soak period. A manufacturer may use a faster heating rate or a longer period for stabilizing fuel temperatures if the needed heating cannot be easily accomplished in the 6-hour period, subject to Administrator approval.

(1) Fuel temperatures must be held at 95± 3° F for at least one hour before the start of the running loss test.

(2) If a vehicle's fuel temperature profile has an initial temperature lower than 95° F, as described in § 86.129–94(d)(7)(v), the fuel in the test vehicle must be stabilized to within 3° F of that temperature for at least one hour before the start of the running loss test.

(g) *Running loss test.* * * *

(1) *Enclosure method.* * * *

(v) Fans shall be positioned as described in §§ 86.107–96 (d) and (h).

* * * * *

(vii) Connect the air intake equipment to the vehicle, if applicable. This connection shall be made to minimize leakage.

(viii) The temperature and pressure recording systems shall be started. Measurement of vapor temperature is optional during the running loss test. If vapor temperature is not measured, fuel tank pressure need not be measured.

* * * * *

(xii) When the ambient temperature is 95±5° F (35±3° C) and the fuel has been stabilized according to paragraph (f) of this section, the running loss test may begin. Measure the initial ambient temperature and pressure.

(A) Analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCi}, required in § 86.143. Hydrocarbon emissions may be sampled continuously during the test period.

* * * * *

(xiv) The ambient temperature shall be maintained at 95±5° F (95±2° F on average) during the running loss test, measured at the inlet to the cooling fan in front of the vehicle; it shall be recorded at least every 60 seconds.

(xv) The fuel temperature during the dynamometer drive shall be controlled to match the fuel tank temperature profile determined in § 86.129. Measured fuel temperatures must be within ±3° F of the target profile throughout the test run. Vapor temperatures, if measured, must be within ±5° F of the target profile during the first 4186 seconds of the running loss test, and within ±3° F for the remaining 120 seconds of the test run. For any vehicle complying with the test standards, vapor temperatures may be higher than the specified tolerances without invalidating test results. For testing by the Administrator, vapor temperatures may be lower than the specified tolerances without invalidating test results. If the test vehicle has more than one fuel tank, the temperatures for both fuel tanks shall

follow the target profiles determined in § 86.129. The control system shall be tuned and operated to provide smooth and continuous tank temperature profiles that are representative of the on-road profiles.

(xvi) Tank pressure shall not exceed 10 inches of water at any time during the running loss test unless a pressurized system is used and the manufacturer demonstrates that vapor would not be vented to the atmosphere upon fuel cap removal. A vehicle may exceed the pressure limit for temporary periods during the running loss test, up to 10 percent of the total driving time, provided that the vehicle has demonstrated conformance with the pressure limit during the entire outdoor driving period specified in § 86.129. Measurement of fuel tank pressures will be considered valid only if vapor temperatures are measured and controlled to the tolerances specified in paragraph (g)(1)(xv) of this section.

* * * * *

(xx) * * *

(C) Turn off all the fans specified in § 86.107–96(d). Also, the time that the vehicle's engine compartment cover is open for removal of air intake equipment, if applicable, shall be minimized to avoid loss of heat from the engine compartment.

* * * * *

(2) *Point-source method.* * * *

(v) Fans shall be positioned as described in § 86.107–96(d).

* * * * *

(vii) The temperature and pressure recording systems shall be started. Measurement of vapor temperature is optional during the running loss test. If vapor temperature is not measured, fuel tank pressure need not be measured.

* * * * *

(x) The ambient temperature shall be maintained at 95±5° F (95±2° F on average) during the running loss test, measured at the inlet to the cooling fan in front of the vehicle; it shall be recorded at least every 60 seconds.

* * * * *

(xii) The tank pressure requirements described in paragraph (g)(1)(xvi) of this section apply also to running loss testing by the point source method.

* * * * *

(xv) At the end of the running loss test, turn off all the fans specified in § 86.107–96(d).

* * * * *

27. Section 86.138–90 of subpart B is amended by revising paragraph (b) to read as follows:

§ 86.138–90 Hot soak test.

* * * * *

(b) The enclosure doors shall be closed and sealed within two minutes of engine shutdown and within seven minutes after the end of the exhaust emission test. The steps after the end of the driving cycle should be done as quickly as possible to minimize the time needed to start the hot soak test.

* * * * *

28. Section 86.138–96 of subpart B is amended by revising paragraphs (a)(2), (b)(2)(v)(A), and (b)(2)(viii) to read as follows:

§ 86.138–96 Hot soak test.

(a) * * *

(2) *Gaseous-fueled vehicles.* Since gaseous-fueled vehicles are not required to perform a running loss test, the hot soak test shall be conducted within seven minutes after completion of the hot start exhaust test.

(b) * * *

(2) * * *

(v) * * *

(A) Analyze the enclosure atmosphere for hydrocarbons and record. This is the initial (time = 0 minutes) hydrocarbon concentration, C_{HCi}, required in § 86.143. Hydrocarbon emissions may be sampled continuously during the test period.

* * * * *

(viii) The vehicle shall enter the enclosure; the enclosure doors shall be closed and sealed within 2 minutes of engine shutdown and within seven minutes after the end of the running loss test.

* * * * *

29. Section 86.143–96 of subpart B is amended by revising paragraphs (b)(1)(i) introductory text and equation, (b)(1)(i)(D), (b)(2)(i)(B), and (b)(2)(ii)(B), adding paragraph (b)(1)(iii), and removing and reserving paragraphs (b)(1)(i)(C) and (b)(1)(i)(E) to read as follows:

§ 86.143–96 Calculations; evaporative emissions.

* * * * *

(b) * * *

(1) * * *

(i) Methanol emissions:

$$M_{CH_3OH} = V_n \times \left[\frac{\left(C_{MS1f} \times AV_{1f}\right) + \left(C_{MS2f} \times AV_{2f}\right)}{V_{E_f}} \right] - \left[\frac{\left(C_{MS1i} \times AV_{1i}\right) + \left(C_{MS2i} \times AV_{2i}\right)}{V_{E_i}} \right] + \left(M_{CH_3OH,out} - M_{CH_3OH,in}\right)$$

Where:

* * * * *

(C) [Reserved].

(D) V_E=Volume of sample withdrawn, ft^3. Sample volumes must be corrected for differences in temperature to be consistent with determination of V_n, prior to being used in the equation.

(E) [Reserved].

* * * * *

(iii) For variable-volume enclosures, defined in § 86.107(a)(1)(i), the following simplified form of the hydrocarbon mass change equation may be used:

$$M_{HC} = \left(\frac{kP_B V_n \times 10^{-4}}{T} \right) \times \left[\left(C_{HC_f} - rC_{CH_3OH_f} \right) - \left(C_{HC_i} - rC_{CH_3OH_i} \right) \right]$$

(2) * * *

(i) * * *

(B) ρ_{CH3OH}= 37.71 g/ft^3, density of pure vapor at 68° F.

* * * * *

(ii) * * *

(B) ρ_{HC}= 16.88 g/ft^3, density of pure vapor at 68° F (for hydrogen to carbon ratio of 2.3).

* * * * *

30. Section 86.146–96 of subpart B is amended by revising paragraphs (f), (i)(1), and (i)(2) to read as follows:

§ 86.146–96 Fuel dispensing spitback procedure.

* * * * *

(f) Following the preconditioning drive, the vehicle shall be moved or driven at minimum throttle to the refueling area.

* * * * *

(i) * * *

(1) The fueling operation shall be started within 4 minutes after the vehicle is turned off and within 8 minutes after completion of the preconditioning drive. The average temperature of the dispensed fuel shall be 65±5° F (18±3° C).

(2) The fuel shall be dispensed at a rate of 9.8±0.3 gallons/minute (37.1±1.1 L/min) until the automatic shutoff is activated.

* * * * *

31. Section 86.152–98 of subpart B is amended by revising paragraph (a) to read as follows:

§ 86.152–98 Vehicle preparation; refueling test.

(a) Provide additional fittings and adapters, as required, to accommodate a fuel drain at the lowest point possible in the tank(s) as installed on the vehicle. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step to avoid damage to the components and the integrity of the fuel system. A replacement canister may be temporarily installed during the soak period while the canister from the test vehicle is preconditioned.

* * * * *

32. Section 86.153–98 is amended by revising paragraphs (a) and (c)(2) to read as follows:

§ 86.153–98 Vehicle and canister preconditioning; refueling test.

(a) *Vehicle and canister preconditioning.* Vehicles and vapor storage canisters shall be preconditioned in accordance with the preconditioning procedures for the supplemental two-diurnal evaporative emissions test specified in § 86.132–96 (a) through (j). For vehicles equipped with non-integrated refueling emission control systems, the canister must be loaded using the method involving butane loading to breakthrough (see § 86.132–96(j)(1)).

* * * * *

(c) * * *

(2) To provide additional opportunity for canister purge, conduct additional driving on a dynamometer, within one hour of completion of the hot start exhaust test, by operating the test vehicle through one UDDS, a 2 minute idle, two NYCCs, another 2 minute idle, another UDDS, then another 2 minute idle (see § 86.115–78 and Appendix I of this part). Fifteen seconds after the engine starts, place the transmission in gear. Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule. The transmission shall be operated according to the specifications of § 86.128–79 during the driving cycles. The vehicle's air conditioner (if so equipped) shall be turned off. Ambient temperature shall be controlled as specified in § 86.151–98. It is not necessary to monitor and/or control in-tank fuel temperatures.

(i) The fixed-speed fan specified in § 86.135–94(b) may be used for engine cooling. If a fixed-speed fan is used, the vehicle's hood shall be opened.

(ii) Alternatively, the roadspeed-modulated fan specified in § 86.107–96(d)(1) may be used for engine cooling. If a road-speed modulated fan is used, the vehicle's hood shall be closed.

* * * * *

33. Section 86.154–98 is amended by revising paragraph (e)(3) to read as follows:

§ 86.154–98 Measurement procedure; refueling test.

* * * * *

(e) * * *

(3) An electrical ground shall be attached to the vehicle. The vehicle fuel filler cap shall be removed and the enclosure door shall be closed and sealed within two minutes of cap removal. The FID (or HFID) trace shall be allowed to stabilize.

* * * * *

Subpart G—[Amended]

34. Section 86.608–90 of subpart G is amended by revising paragraph (a)(2)(ii) to read as follows:

§ 86.608–90 Test procedures.

(a) * * *

(2) * * *

(ii) The manufacturer may measure the temperature of the test fuel at other than the approximate mid-volume of the fuel tank, as specified in § 86.131–96(a) with only a single temperature sensor, and may drain the test fuel from other than the lowest point of the tank, as specified in § 86.131–96(b), provided an equivalent method is used. Equivalency documentation shall be maintained by the manufacturers and shall be made available to the Administrator upon request. Additionally, for any test vehicle that has remained under laboratory ambient temperature conditions for at least 6 hours prior to testing, the vehicle soak described in § 86.132–96(c) may be eliminated upon approval of the Administrator. In such cases, the vehicle shall be operated through the preconditioning drive described in § 86.132–96(c) immediately following the fuel drain and fill procedure described in § 86.132–96(b).

* * * * *

35. Section 86.608–98 of subpart G is amended by revising paragraph (a)(2)(ii) to read as follows:

§ 86.608–98 Test procedures.

(a) * * *

(2) * * *

(ii) The manufacturer may measure the temperature of the test fuel at other than the approximate mid-volume of the fuel tank, as specified in § 86.131–96(a) with only a single temperature sensor, and may drain the test fuel from other than the lowest point of the tank, as specified in § 86.131–96(b) and § 86.152–98(a), provided an equivalent method is used. Equivalency documentation shall be maintained by the manufacturers and shall be made available to the Administrator upon request. Additionally, for any test vehicle that has remained under laboratory ambient temperature conditions for at least 6 hours prior to testing, the vehicle soak described in § 86.132–96(c) may be eliminated upon approval of the Administrator. In such cases, the vehicle shall be operated through the preconditioning drive described in § 86.132–96(c) immediately following the fuel drain and fill procedure described in § 86.132–96(b).

* * * * *

Subpart M—[Amended]

36. Section 86.1207–96 of subpart M is amended by revising paragraphs (a)(1) introductory text, (a)(1)(ii)(A), (a)(1)(ii)(B), (a)(2), (a)(3)(i), (a)(3)(ii), (c)(1), (d), (e), and (f) to read as follows:

§ 86.1207–96 Sampling and analytical systems; evaporative emissions.

(a) *Testing enclosures*—(1) *Diurnal emission test.* The enclosure shall be readily sealable, rectangular in shape, with space for personnel access to all sides of the vehicle. When sealed, the enclosure shall be gas tight in accordance with § 86.1217–96. Interior surfaces must be impermeable and nonreactive to hydrocarbons (and to methanol, if the enclosure is used for methanol-fueled vehicles). The temperature conditioning system shall

be capable of controlling the internal enclosure air temperature to follow the prescribed temperature versus time cycle as specified in § 86.1233–96 and Appendix II of this part, within an instantaneous tolerance of ±3.0 °F of the nominal temperature versus time profile throughout the test, and an average tolerance of 2.0 °F over the duration of the test (where the average is calculated using the absolute value of each measured deviation). The control system shall be tuned to provide a smooth temperature pattern that has a minimum of overshoot, hunting, and instability about the desired long-term ambient temperature profile. Interior surface temperatures shall not be less than 40 °F at any time during the diurnal emission test. To accommodate the volume changes due to enclosure temperature changes, either a variable-volume or fixed-volume enclosure may be used for diurnal emission testing:

* * * * *

(ii) *Fixed-volume enclosure.* * * *

(A) The enclosure shall be equipped with a mechanism to maintain a fixed internal air volume. This may be accomplished either by withdrawing air at a constant rate and providing makeup air as needed, or by reversing the flow of air into and out of the enclosure in response to rising or falling temperatures. If inlet air is added continuously throughout the test, it should be filtered with activated carbon to provide a relatively low and constant hydrocarbon level. Any method of volume accommodation shall maintain the differential between the enclosure internal pressure and the barometric pressure to a maximum value of ±2.0 inches of water.

(B) The equipment shall be capable of measuring the mass of hydrocarbon and methanol (if the enclosure is used for methanol-fueled vehicles) in the inlet and outlet flow streams with a resolution of 0.01 gram per hour. A bag sampling system may be used to collect a proportional sample of the air withdrawn from and admitted to the enclosure. Alternatively, the inlet and outlet flow streams may be continuously analyzed using an on-line FID analyzer and integrated with the flow measurements to provide a continuous record of the mass hydrocarbon and methanol removal.

(2) *Running loss test.* The enclosure shall be readily sealable, rectangular in shape, with space for personnel access to all sides of the vehicle. When sealed, the enclosure shall be gas tight in accordance with § 86.1217–96. The enclosure may be equipped with a personnel door, provided that the enclosure can still meet the requirements of § 86.1217–96 with the door installed. Interior surfaces must be impermeable and nonreactive to hydrocarbons and to methanol (if the enclosure is used for methanol-fueled vehicles). Interior surface temperatures shall not be less than 40 °F. If a running loss enclosure meets all the requirements of paragraph (a)(1) of this section, it may be used as a diurnal evaporative emission enclosure. The enclosure must contain a dynamometer that meets the requirements of § 86.1208. Provisions shall be made to remove exhaust gases from the enclosure. During the running loss test, ambient temperatures must be maintained at 95±5 °F (95±2 °F on average). An air or oxygen cylinder with an attached self-contained breathing apparatus may be provided for the vehicle operator. The air required for vehicle operation shall be provided by one of the following methods:

(i) The running loss enclosure may be equipped to supply air to the vehicle, at a temperature of 95±5° F, from sources outside of the running loss enclosure directly into the operating engine's air intake system. Supplemental air requirements (e.g., for an air pump) shall be supplied by drawing air from the engine intake source.

(ii) If it is shown to yield equivalent or superior results, the running loss enclosure may be designed with an air makeup system that brings outside air into the enclosure to accommodate the aspiration needs of the engine and any auxiliary devices. The makeup air shall be monitored to establish the background hydrocarbon levels (or hydrocarbon and methanol, levels, if applicable) of the makeup air. A filter may be used to provide dry air with a stable concentration of background hydrocarbon. The makeup-air vent shall be readily sealable for calibration of the enclosure and other purposes. For calculation of running loss emissions, it may be assumed that the hydrocarbon and methanol concentration in the air consumed by the vehicle is the same as that of the rest of the air in the enclosure.

(3) *Hot soak test.* * * *

(i) If the hot soak test is conducted in the same enclosure as the immediately preceding running loss test, interior surface temperatures shall not be below 70° F for the last 55 minutes of the hot soak test.

(ii) If the hot soak test is not conducted in the same enclosure as the immediately preceding running loss test, interior surface temperatures shall not be below 70° F for the duration of the hot soak test.

* * * * *

(c) *Evaporative emission hydrocarbon and methanol data recording system.* (1) The electrical output of the FID used for measuring hydrocarbons (or hydrocarbons plus methanol, as appropriate) shall be recorded at least at the initiation and termination of each running loss and hot soak test, and at least at the initiation and termination of the enclosure sampling period(s) for the diurnal emission test, as described in § 86.1233. The recording may be taken by means of a strip chart potentiometric recorder, by use of an on-line computer system or other suitable means. In any case, the recording system must have operational characteristics (signal-to-noise ratio, speed of response, etc.) equivalent to or better than those of the signal source being recorded, and must provide a permanent record of results. The record shall show a positive indication of the initiation and completion of each hot soak, running loss, or diurnal emission test (including initiation and completion of sampling period(s)), along with the time elapsed during each soak.

* * * * *

(d) *Fuel temperature control system.* Fuel temperatures of the test vehicle shall be controlled, as specified in § 86.1234(g)(1)(xv), with the following combination of fans. The control system shall be tuned and operated to provide a smooth and continuous fuel temperature profile that is representative of the on-road temperature profile. The running loss test configuration should be designed to avoid heating or cooling the fuel tank's vapor space in a way that would cause vapor temperature behavior to be unrepresentative of the vehicle's on-road profile.

(1) A vehicle cooling fan shall discharge air to the front of the vehicle. The fan shall be a road-speed modulated fan that is controlled to a discharge velocity that follows the dynamometer roll speed, at least up to speeds of 30 mph, throughout the driving cycle. If a warning light or gauge indicates that the vehicle's engine coolant has overheated, subsequent test runs on the that vehicle must include a vehicle cooling fan that follows the dynamometer roll speed at all speeds throughout the test cycle. The fan may direct airflow to both the vehicle radiator air inlet(s) and the vehicle underbody.

(2) An additional fan may be used to discharge airflow from the front of the vehicle directly to the vehicle underbody to control fuel temperatures.

Such a fan shall provide a total discharge airflow not to exceed 8,000 cfm.

(3) Additional fans may be used to route heating or cooling air directly at the bottom of the vehicle's fuel tank. The air supplied to the tank shall be between 85° and 160° F, with a total discharge airflow not to exceed 4,000 cfm. For exceptional circumstances, manufacturers may direct up to 6,000 cfm at the bottom of the fuel tank with the advance approval of the Administrator.

(4) Direct fuel heating may be needed for canister preconditioning, as specified in § 86.1232(j)(2). Also, under exceptional circumstances in which airflow alone is insufficient to control fuel temperatures during the running loss test, direct fuel tank heating may be used (see § 86.1234–96(g)(1)(xv)). The heating system must not cause hot spots on the tank wetted surface that could cause local overheating of the fuel. Heat must not be applied directly to the tank's vapor space, nor to the liquid-vapor interface.

(e) *Temperature recording system.* A strip chart potentiometric recorder, an on-line computer system, or other suitable means shall be used to record enclosure ambient temperature during all evaporative emission test segments, as well as vehicle fuel tank temperature during the running loss test. The recording system shall record each temperature at least once every minute. The recording system shall be capable of resolving time to ±15 s and capable of resolving temperature to ±0.75° F (±0.42° C). The temperature recording system (recorder and sensor) shall have an accuracy of ±3° F (±1.7° C). The recorder (data processor) shall have a time accuracy of ±15 s and a precision of ±15 s. Enclosures shall be equipped with two ambient temperature sensors, connected to provide one average output, located 3 feet above the floor at the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall. For diurnal emission testing, an additional temperature sensor shall be located underneath the vehicle to provide a temperature measurement representative of the air temperature under the fuel tank. For running loss testing, an ambient temperature sensor shall be located at the inlet to the fan that provides engine cooling. Manufacturers shall arrange that vehicles furnished for testing at federal certification facilities be equipped with temperature sensors for measurement of fuel tank temperatures. Vehicles shall be equipped with two temperature sensors installed to provide an average liquid fuel temperature. The temperature sensors shall be placed to measure the temperature at the mid-volume of the liquid fuel at a fill level of 40 percent of nominal tank capacity. An additional temperature sensor may be placed to measure vapor temperatures approximately at the mid-volume of the vapor space, though measurement of vapor temperatures is optional during the running loss test. In-tank temperature sensors are not required for the supplemental two-diurnal test sequence specified in § 86.1230–96.

(f) *Pressure recording system.* A strip chart potentiometric recorder, an on-line computer system, or other suitable means, shall be used to record the enclosure gage pressure for any testing in an enclosure, as well as the vehicle's fuel tank pressure during the running loss test and the outdoor driving procedure specified in § 86.1229–85(d). Fuel tank pressure measurement and recording equipment are optional during the running loss test. The recording system shall record each pressure at least once every minute. The recording system shall be capable of resolving time to ±15 s and capable of resolving pressure to ±0.1 inches of water. The pressure recording system (recorder and sensor) shall have an accuracy of ±1.0 inch of water. The recorder (data processor) shall have a time accuracy of ±15 s and a precision of ±15 s. The pressure transducer shall be installed to measure the pressure in the vapor space of the fuel tank.

* * * * *

37. Section 86.1217–96 of subpart M is amended by revising the introductory text and paragraphs (a)(1)(ii), (a)(1)(iii), (a)(7), (b), (c) heading, (c)(1) introductory text, (c)(1)(v), (c)(1)(vii), (d)(1) introductory text and equation, (d)(1)(v), and (e)(1)(iii), adding paragraphs (d)(1)(xiii), (d)(1)(xiv), and (d)(3), and removing and reserving paragraphs (c)(1)(iv), (d)(1)(iii) and (d)(1)(iv) to read as follows:

§ 86.1217–96 Evaporative emission enclosure calibrations.

The calibration of evaporative emission enclosures consists of three parts: initial and periodic determination of enclosure background emissions (hydrocarbons and methanol); initial determination of enclosure internal volume; and periodic hydrocarbon and methanol retention check and calibration. Methanol measurements may be omitted if methanol-fueled vehicles will not be tested in the evaporative enclosure. Alternate calibration methods may be used if shown to yield equivalent or superior results, and if approved in advance by the Administrator; specifically, more extreme temperatures may be used for determining calibration without affecting the validity of test results.

(a) *Initial and periodic determination of enclosure background emissions.*

* * *

(1) * * *

(ii) Fixed-volume enclosures may be operated with inlet and outlet flow streams either closed or open; if inlet and outlet flow streams are open, the air flowing into and out of the enclosure must be monitored in accordance with § 86.107–96(a)(1)(ii)(B). Ambient temperatures shall be maintained at 96±3° F throughout the 4-hour period.

(iii) For running loss enclosures ambient temperatures shall be maintained at 95±3° F throughout the 4-hour period. For running loss enclosures designed with a vent for makeup air, the enclosure shall be operated with the vent closed.

* * * * *

(7) Allow the enclosure to stand undisturbed for four hours.

* * * * *

(b) *Initial determination of enclosure internal volume.* Prior to its introduction into service the enclosure internal volume shall be determined by the following procedure:

(1) Carefully measure the internal length, width and height of the enclosure, accounting for irregularities (such as braces) and calculate the internal volume. For variable-volume enclosures, latch the enclosure to a fixed volume when the enclosure is held at a constant temperature; this nominal volume shall be repeatable within ±0.5 percent of the reported value.

(2) [Reserved].

(3) [Reserved].

(c) *Hydrocarbon and methanol (organic gas) retention check and calibration.* * * *

(1) An enclosure to be used for the diurnal emission test (see § 86.1233–96) shall be calibrated according to the following procedure. Calibration for hydrocarbon and methanol may be conducted simultaneously or in sequential test runs.

* * * * *

(iv) [Reserved].

(v) Turn on the ambient temperature control system (if not already on) and adjust it for an initial temperature of 96° F (36° C). On variable-volume enclosures, latch the enclosure to the appropriate volume position for the set temperature. On fixed-volume enclosures close the outlet and inlet flow streams.

* * * * *

(vii) Inject into the enclosure 2 to 6 grams of pure methanol at a temperature of at least 150° F (65° C) and/or 2 to 6 grams of pure propane. The injected quantity may be measured by volume flow or by mass measurement. The method used to measure the quantity of methanol and propane shall have an accuracy of ±0.2 percent of the measured value (less accurate methods may be used with the advance approval of the Administrator).

* * * * *

(d) *Calculations.* (1) The calculation of net methanol and hydrocarbon mass change is used to determine enclosure background and leak rate. It is also used to check the enclosure volume measurements. The methanol mass change is calculated from the initial and final methanol samples, the net withdrawn methanol (in the case of diurnal emission testing with fixed-volume enclosures), and initial and final temperature and pressure according to the following equation:

$$M_{CH_3OH} = V_n \times \left[\frac{\left(C_{MS1f} \times AV_{1f}\right) + \left(C_{MS2f} \times AV_{2f}\right)}{V_{E_f}}\right] - \left[\frac{\left(C_{MS1i} \times AV_{1i}\right) + \left(C_{MS2i} \times AV_{2i}\right)}{V_{E_i}}\right] + \left(M_{CH_3OH,out} - M_{CH_3OH,in}\right)$$

Where:

* * * * *

(iii) [Reserved].

(iv) [Reserved].

(v) V_E=Volume of sample withdrawn, ft^3. Sample volumes must be corrected for differences in temperature to be consistent with determination of V_n, prior to being used in the equation.

* * * * *

(xiii) $M_{CH3OH,out}$=mass of methanol exiting the enclosure, in the case of fixed-volume enclosures for diurnal emission testing, µg.

(xiv) $M_{CH3OH,in}$=mass of methanol entering the enclosure, in the case of fixed-volume enclosures for diurnal emission testing, µg.

* * * * *

(3) For variable-volume enclosures, defined in § 86.1207(a)(1)(i), the following simplified form of the hydrocarbon mass change equation may be used:

$$M_{HC} = \left(\frac{kP_B V_n \times 10^{-4}}{T}\right) \times \left[\left(C_{HC_f} - rC_{CH_3OH_f}\right) - \left(C_{HC_i} - rC_{CH_3OH_i}\right)\right]$$

(e) *Calibration of equipment for point-source testing of running losses.* * * *

(1) * * *

(iii) Operate the vapor sampling system in the normal manner and release a known quantity of pure propane into the most frequently used fuel vapor collector during the sampling period (approximately 5 minutes).

* * * * *

38. Section 86.1229–85 of subpart M is amended by revising paragraphs (d)(1), (d)(2)(iii), (d)(3)(ii), (d)(3)(iii), (d)(4)(i), (d)(4)(ii), (d)(4)(iii), (d)(7)(iii), and (d)(7)(iv) and adding paragraph (d)(7)(v) to read as follows:

§ 86.1229–85 Dynamometer load determination and fuel temperature profile.

* * * * *

(d) *Fuel temperature profile*—(1) *General requirements.* (i) To be tested for running losses, as specified in § 86.1234, a vehicle must have a fuel temperature profile. The following procedure is used to generate the fuel temperature profile, which serves as a target for controlling fuel temperatures during the running loss test. This profile represents the fuel temperature change that occurs during on-road driving. If a vehicle has more than one fuel tank, a profile shall be established for each tank. Manufacturers may also simultaneously generate a profile for vapor temperatures.

(ii) If a manufacturer uses a vehicle model to develop a profile to represent multiple models, the vehicle model selected must have the greatest expected fuel temperature increase during driving of all those models it represents. Also, manufacturers must select test vehicles with any available vehicle options that increase fuel temperatures during driving (for example, any feature that limits underbody airflow).

(iii) Manufacturers may conduct testing to develop fuel temperature profiles in a laboratory setting, subject to approval by the Administrator. The laboratory facility should simulate outdoor testing to reproduce fuel and vapor temperature behavior over the specified driving schedule. The design of the laboratory facility should include consideration of any parameters that may affect fuel temperatures, such as solar loading, pavement heat, and relative wind velocities around and underneath the test vehicle. Indoor testing to develop the fuel temperature profiles must be conducted with little or no vehicle-specific adjustment of laboratory parameters. Manufacturers would need to maintain an ongoing demonstration of correlation between laboratory and outdoor measurement of fuel temperatures. Specifically, fuel temperatures and pressures from indoor driving should be at least as high as measured when driving outdoors according to the procedures described in this section.

(iv) Small-volume manufacturers, as defined in § 86.094–14(b)(1), may use an alternate method for generating fuel temperature profiles, subject to the approval of the Administrator.

(v) The Administrator may conduct testing to establish any vehicle's temperature profiles or to verify compliance with fuel tank pressure requirements.

(2) * * *

(iii) The data recording system described in paragraph (d)(2)(ii) of this section shall be capable of resolving time to ±1 s, capable of resolving temperature to ±2° F, capable of resolving pressure to ±1.0 inch of water, and capable of resolving speed to ±1 mph. The temperature and pressure signals shall be recorded at intervals of up to 1 minute; speed signals shall be recorded at intervals of up to 1 second.

(3) * * *

(ii) Wind conditions shall be calm to light with maximum wind speed of 15 mph. In the case of temporary gusting, wind speeds between 15 and 25 mph may occur for up to 5 percent of the total driving time without invalidating the data collection. Wind speed shall be measured and recorded in regular intervals of at least once per minute. Measure wind speed with the following

requirements (based on *Federal Standard for Siting Meteorological Sensors at Airports*, FCM–S4–1987). The site should be relatively level, but small gradual slopes are acceptable. The sensor shall be mounted 30 to 33 feet (9 to 10 meters) above the average ground height within a radius of 500 feet (150 meters). The sensor height shall not exceed 33 feet, except as necessary to be at least 15 feet (5 meters) above the height of any obstruction (e.g. vegetation, buildings, etc.) within a 500 foot (150 meter) radius. An object is considered to be an obstruction if the included lateral angle from the sensor to the ends of the object is 10 degrees or more.

(iii) Road surface temperature shall be at least 125° F throughout the driving period. Pavement temperature shall be measured and recorded in regular intervals of at least once per minute. The track temperature may be measured with an embedded sensor, a portable temperature probe, or an infrared pyrometer that can provide an accuracy of ±2° F. Temperatures must be measured on a surface representative of the surface where the vehicle is driven.

* * * * *

(4) *Profile determination procedure.* (i) Drain the fuel tank(s) and fill with test fuel to the ''tank fuel volume'' defined in § 86.082–2. The test fuel should meet the specifications of § 86.1213, except that fuel with a lower volatility may be used, subject to Administrator approval. Manufacturers using a lower volatility fuel must generate a vapor temperature profile for demonstrating compliance with the limit on fuel tank pressure during the running loss test (see § 86.1234–96).

(ii) The vehicle shall be moved to the location where the data is to be collected. It may be driven a maximum distance of 5 miles and may also be transported by other means. The vehicle shall be stabilized by one of the following methods:

(A) The vehicle shall be parked for a minimum of 12 hours in an open area on a surface that is representative of the test road, without any artificial heating or cooling of the fuel. The orientation of the front of the vehicle during parking (e.g., N, SW, etc.) shall be documented.

(B) The vehicle may be soaked in a temperature-controlled environment to stabilize fuel temperatures. Before starting the drive, the vehicle shall be stabilized with fuel temperatures 95±3° F for at least one hour. The fuel temperature may not exceed 98° F at any time before the beginning of the driving schedule, during which only whole-vehicle heating and cooling may be used to control fuel temperatures. If a manufacturer uses the provisions of paragraph (d)(7)(v) of this section to establish a lower initial fuel temperature for the running loss test, the fuel in the test vehicle may not be stabilized at a temperature higher than the newly established initial fuel temperature.

(iii) Once the ambient conditions specified in paragraph (d)(3) of this section are met and the vehicle has been stabilized according to paragraph (d)(4)(ii) of this section, the vehicle's engine may be started. The vehicle's air conditioning system (if so equipped) shall be set to the ''normal'' air conditioning mode and adjusted to the minimum discharge air temperature and high fan speed. Vehicles equipped with automatic temperature controlled air conditioning systems shall be set to operate in ''automatic'' temperature and fan modes with the system set at 72° F.

* * * * *

(7) * * *

(iii) If all these requirements are met, the following calculations shall be performed to determine a profile for liquid fuel temperatures and, if applicable, for vapor temperatures: $T_{i,profile}=T_i-T_o$.

Where:

(A) $T_{i,profile}$=the series of temperatures that comprise the relative temperature profile.

(B) T_i=the series of observed liquid fuel or vapor temperatures during the drive.

(C) T_o=the liquid fuel or vapor temperature observed at the start of the specified driving schedule.

(iv) The relative temperature profile consists of the set of temperatures at each 1-minute interval. If temperatures are sampled more frequently than once per minute, the temperature data points may represent a rolling average of temperatures sampled for up to one-minute intervals. If multiple valid test runs are conducted for any model, then all the collected data shall be used to calculate a composite profile, based on the average temperatures at each point. The absolute temperature profile is determined by adding 95° F (35° C) to each point of the relative profile. Other methodologies for developing corrected liquid fuel and vapor space temperature profiles may be used if demonstrated to yield equivalent results and approved in advance by the Administrator.

(v) Manufacturers may use a lower initial fuel temperature for the running loss test, if approved in advance by the Administrator. To demonstrate the need for such an adjustment, manufacturers would be expected to determine the maximum fuel temperature experienced by a vehicle during an extended park or after driving one UDDS cycle when exposed to the ambient conditions described in paragraph (d)(3) of this section. To use this provision, manufacturers would have to show maximum fuel temperatures no greater than 92° F.

39. Section 86.1230–96 of subpart M is amended by revising figure M96–1 at the end of the section and adding paragraph (e) to read as follows:

§ 86.1230–96 Test sequence; general requirements.

* * * * *

(e) If tests are invalidated after collection of emission data from previous test segments, the test may be repeated to collect only those data points needed to complete emission measurements. Compliance with emission standards may be determined by combining emission measurements from different test runs. If any emission measurements are repeated, the new measurements supersede previous values.

BILLING CODE 6560–50–P

Federal Test Procedure

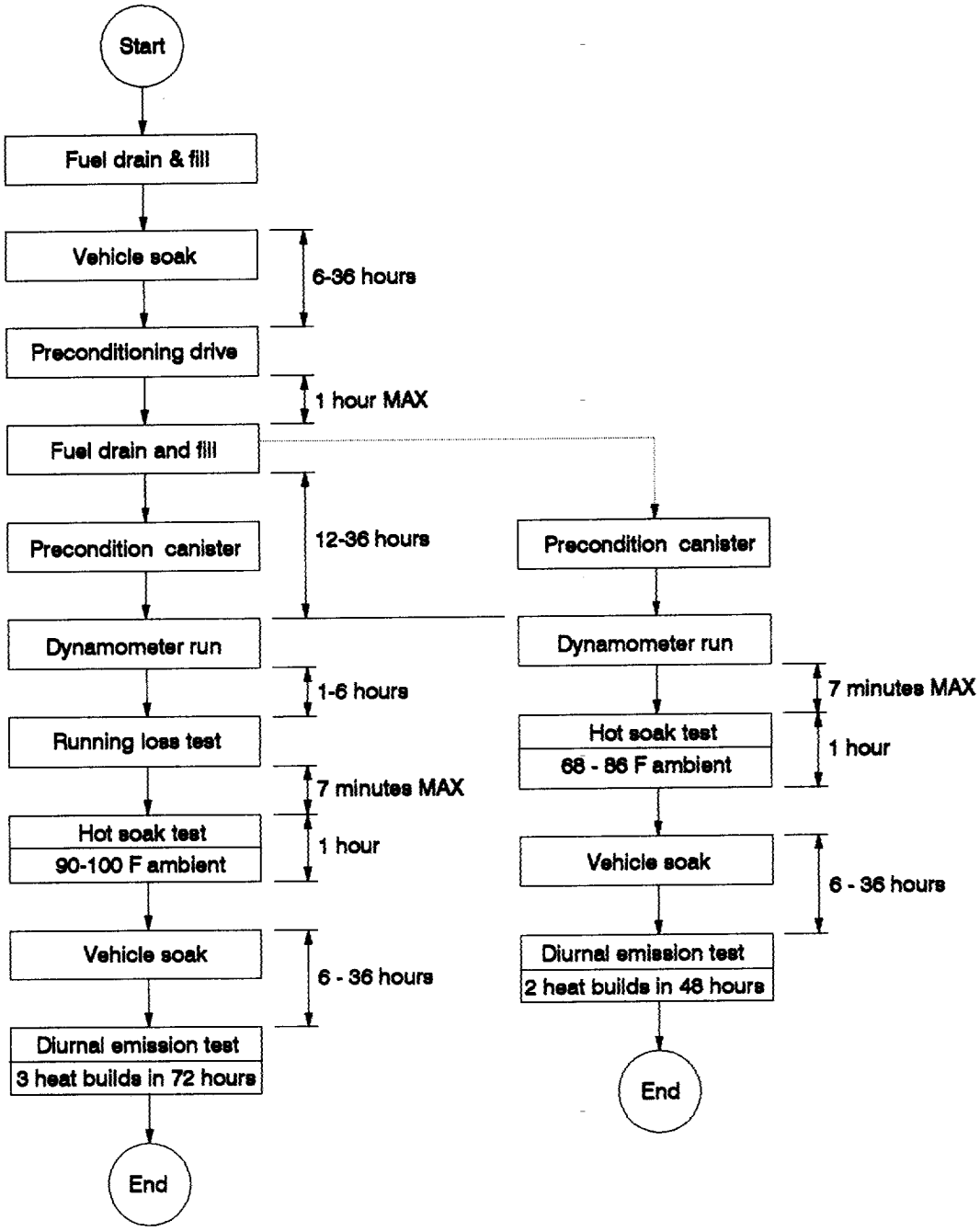

Figure M96-1 Test sequence

BILLING CODE 6560–50–C

40. Section 86.1231–96 of subpart M is amended by revising paragraph (d) to read as follows:

§ 86.1231–96 Vehicle preparation.

* * * * *

(d) For vehicles to be tested for running loss emissions, prepare the fuel tank(s) for measuring and recording the temperature and pressure of the fuel tank as specified in § 86.1207–96 (e) and (f). Measurement of vapor temperature is optional during the running loss test. If vapor temperature is not measured, fuel tank pressure need not be measured.

* * * * *

41. Section 86.1232–96 of subpart M is amended by revising paragraphs (c), (f), (h) introductory text, (h)(1)(i), (h)(2), (j) introductory text, (j)(1) introductory text, (j)(1)(i), and (j)(1)(vi) to read as follows:

§ 86.1232–96 Vehicle preconditioning.

* * * * *

(c) Gasoline- and methanol-fueled vehicles shall be soaked for at least 6 hours after being refueled. Gaseous-fueled vehicles shall be soaked for at least 1 hour after being refueled. Following this soak period, the test vehicle shall be placed, either by being driven or pushed, on a dynamometer and operated through one Heavy-Duty Vehicle Urban Dynamometer Driving schedule, specified in § 86.1215 and Appendix I of this part. Once a test vehicle has completed the refueling and vehicle soak steps specified in paragraphs (b) and (c) of this section, these steps may be omitted in subsequent testing with the same vehicle and the same fuel specifications, provided the vehicle remains under laboratory ambient temperature conditions for at least 6 hours before starting the next test. In such cases, each subsequent test shall begin with the preconditioning drive specified in this paragraph. The test vehicle may not be used to set dynamometer horsepower.

* * * * *

(f)(1) *Gasoline- and methanol-fueled vehicles.* After completion of the preconditioning drive, the vehicle shall be driven off the dynamometer. The vehicle's fuel tank(s) shall be drained and then filled with test fuel, as specified in § 86.1213, to the ''tank fuel volume'' defined in § 86.082–2. The vehicle shall be refueled within 1 hour after completion of the preconditioning drive. The fuel cap(s) shall be installed within 1 minute after refueling. The vehicle shall be parked within five minutes after refueling.

(2) *Gaseous-fueled vehicles.* After completion of the preconditioning drive, the vehicle shall be driven off the dynamometer. Vehicle fuel tanks shall be refilled with fuel that meets the specifications in § 86.1213. Fuel tanks shall be filled to a minimum of 75% of service pressure for natural gas-fueled vehicles or a minimum of 75% of available fill volume for liquefied petroleum gas-fueled vehicles. Prior draining of the fuel tanks is not called for if the fuel in the tanks already meets the specifications in § 86.1213. The vehicle shall be parked within five minutes after refueling, or, in the absence of refueling, within five minutes after completion of the preconditioning drive.

* * * * *

(h) During the soak period for the three-diurnal test sequence described in § 86.1230–96, evaporative canisters, if the vehicle is so equipped, shall be preconditioned according to the following procedure. For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel configuration, each canister must be preconditioned separately. If production evaporative canisters are equipped with a functional service port designed for vapor load or purge steps, the service port shall be used during testing to precondition the canister. In addition, for model year 1998 and later vehicles equipped with refueling canisters, these canisters shall be preconditioned for the three-diurnal test sequence according to the procedure in paragraph (j)(1) of this section. If a vehicle is designed to actively control evaporative or refueling emissions without a canister, the manufacturer shall devise an appropriate preconditioning procedure, subject to the approval of the Administrator.

(1)(i) Prepare the evaporative emission canister for the canister purging and loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step to avoid damage to the components and the integrity of the fuel system. A replacement canister may be temporarily installed during the soak period while the canister from the test vehicle is preconditioned.

* * * * *

(2) For methanol-fueled and flexible-fueled vehicles, canister preconditioning shall be performed with a fuel vapor composition representative of that which the vehicle would generate with the fuel mixture used for the current test. Manufacturers shall develop a procedure to precondition the evaporative canister, if the vehicle is so equipped, for the different fuel. The procedure shall represent a canister loading equivalent to that specified in paragraph (h)(1) of this section and shall be approved in advance by the Administrator.

* * * * *

(j) For the supplemental two-diurnal test sequence described in § 86.1230–96, one of the following methods shall be used to precondition evaporative canisters during the soak period specified in paragraph (g) of this section. For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel configuration, each canister must be preconditioned separately. In addition, for model year 1998 and later vehicles equipped with refueling canisters, these canisters shall be preconditioned for the supplemental two-diurnal test sequence according to the procedure in paragraph (j)(1) of this section. Canister emissions are measured to determine breakthrough. Breakthrough is here defined as the point at which the cumulative quantity of hydrocarbons emitted is equal to 2 grams.

(1) *Butane loading to breakthrough.* The following procedure provides for emission measurement in an enclosure. Breakthrough may also be determined by measuring the weight gain of an auxiliary evaporative canister connected downstream of the vehicle's canister, in which case, the following references to the enclosure can be ignored. The auxiliary canister shall be well purged prior to loading. If production evaporative canisters are equipped with a functional service port designed for vapor load or purge steps, the service port shall be used during testing to precondition the canister.

(i) Prepare the evaporative/refueling emission canister for the canister loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step to avoid damage to the components and the integrity of the fuel system. A replacement canister may be temporarily installed during the soak period while the canister from the test vehicle is preconditioned.

* * * * *

(vi)(A) For gasoline-fueled vehicles, load the canister with a mixture composed of 50 percent butane and 50 percent nitrogen by volume at a rate of 40 grams butane per hour.

(B) For methanol-fueled and flexible-fueled vehicles, canister preconditioning shall be performed with a fuel vapor composition representative of that which the vehicle would generate with the fuel mixture used for the current test. Manufacturers shall develop a procedure to precondition the evaporative canister, if the vehicle is so equipped, for the different fuel.

* * * * *

42. Section 86.1233–96 of subpart M is amended by revising paragraphs (c), (h), and (i)(5) to read as follows:

§ 86.1233–96 Diurnal emission test.

* * * * *

(c) The test vehicle shall be exposed to ambient temperatures cycled according to the profile specified in § 86.1233 and Appendix II of this part.

(1) Temperatures measured with the underbody temperature sensor shall follow the profile with a maximum deviation of 3° F at any time and an average temperature deviation not to exceed 2° F, where the average deviation is calculated using the absolute value of each measured deviation. In addition, the temperature from the sidewall temperature sensors shall follow the profile with a maximum deviation of 5° F at any time.

(2) Ambient temperatures shall be measured at least every minute. Temperature cycling shall begin when time=0 minutes, as specified in paragraph (i)(5) of this section.

* * * * *

(h) Prior to sampling for emissions and throughout the period of cycled ambient temperatures, the mixing fan(s) shall circulate the air at a rate of 0.8±0.2 cfm per cubic foot of ambient volume. The mixing fan(s), plus any additional fans if needed, shall also maintain a minimum wind speed of 5 mph (8 km/hr) under the fuel tank of the test vehicle. The Administrator may adjust fan speed and location to ensure sufficient air circulation around the fuel tank. The wind speed requirement may be satisfied by consistently using a fan configuration that has been demonstrated to maintain a broad 5-mph air flow in the vicinity of the vehicle's fuel tank, subject to verification by the Administrator.

(i) * * *

(5) Within 10 minutes of closing and sealing the doors, analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCi}, required in § 86.1243. Hydrocarbon emissions may be sampled continuously during the test period.

* * * * *

43. Section 86.1234–96 of subpart M is amended by revising paragraphs (a), (f), (g)(1)(v), (g)(1)(vii), (g)(1)(viii), (g)(1)(xii) introductory text, (g)(1)(xii)(A), (g)(1)(xiv), (g)(1)(xv), (g)(1)(xvi), (g)(2)(v), (g)(2)(vii), (g)(2)(x), and (g)(2)(xii) and adding paragraphs (g)(1)(xx)(C) and (g)(2)(xv) to read as follows:

§ 86.1234–96 Running loss test.

(a) *Overview.* Gasoline- and methanol-fueled vehicles are to be tested for running loss emissions during simulated high-temperature urban driving; this test is not required for gaseous-fueled vehicles. During operation, tank temperatures are controlled according to a prescribed profile to simulate in-use conditions. If the vehicle is determined to have exceeded the standard before the end of the running loss test, the test may be terminated without invalidating the data. The test can be run either in a sealed enclosure or with the point-source method, as specified in paragraph (g) of this section. Measurement of vapor temperature is optional during the running loss test; however, if testing by the Administrator shows that a vehicle has exceeded an emission standard without measurement of vapor temperatures, the manufacturer may, utilizing its own resources, conduct subsequent testing on that vehicle to determine if the exceedance is attributable to inadequate control of vapor temperatures.

* * * * *

(f) *Temperature stabilization.* Immediately after the hot transient exhaust emission test, the vehicle shall be soaked in a temperature controlled area for a maximum of 6 hours until the fuel temperature is stabilized. The fuel may be heated or cooled to stabilize fuel temperatures, but the fuel heating rate must not exceed 5° F in any 1-hour interval during the soak period. A manufacturer may use a faster heating rate or a longer period for stabilizing fuel temperatures if the needed heating cannot be easily accomplished in the 6-hour period, subject to Administrator approval.

(1) Fuel temperatures must be held at 95±3° F for at least one hour before the start of the running loss test.

(2) If a vehicle's fuel temperature profile has an initial temperature lower than 95° F, as described in § 86.1229–85(d)(7)(v), the fuel in the test vehicle must be stabilized to within 3° F of that temperature for at least one hour before the start of the running loss test.

(g) *Running loss test.* * * *

(1) *Enclosure method.* * * *

(v) Fans shall be positioned as described in §§ 86.1207–96 (d) and (h).

* * * * *

(vii) Connect the air intake equipment to the vehicle, if applicable. This connection shall be made to minimize leakage.

(viii) The temperature and pressure recording systems shall be started. Measurement of vapor temperature is optional during the running loss test. If vapor temperature is not measured, fuel tank pressure need not be measured.

* * * * *

(xii) When the ambient temperature is 95±5° F (35±3° C) and the fuel has been stabilized according to paragraph (f) of this section, the running loss test may begin. Measure the initial ambient temperature and pressure.

(A) Analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCi}, required in § 86.1243. Hydrocarbon emissions may be sampled continuously during the test period.

* * * * *

(xiv) The ambient temperature shall be maintained at 95±5° F (95±2° F on average) during the running loss test, measured at the inlet to the cooling fan in front of the vehicle; it shall be recorded at least every 60 seconds.

(xv) The fuel temperature during the dynamometer drive shall be controlled to match the fuel tank temperature profile determined in § 86.1229. Measured fuel temperatures must be within ±3° F of the target profile throughout the test run. Vapor temperatures, if measured, must be within ±5° F of the target profile during the first 4186 seconds of the running loss test, and within ±3° F for the remaining 120 seconds of the test run. For any vehicle complying with the test standards, vapor temperatures may be higher than the specified tolerances without invalidating test results. For testing by the Administrator, vapor temperatures may be lower than the specified tolerances without invalidating test results. If the test vehicle has more than one fuel tank, the temperatures for both fuel tanks shall follow the target profiles determined in § 86.1229. The control system shall be tuned and operated to provide smooth and continuous tank temperature profiles that are representative of the on-road profiles.

(xvi) Tank pressure shall not exceed 10 inches of water at any time during

the running loss test unless a pressurized system is used and the manufacturer demonstrates that vapor would not be vented to the atmosphere upon fuel cap removal. A vehicle may exceed the pressure limit for temporary periods during the running loss test, up to 10 percent of the total driving time, provided that the vehicle has demonstrated conformance with the pressure limit during the entire outdoor driving period specified in § 86.1229. Measurement of fuel tank pressures will be considered valid only if vapor temperatures are measured and controlled to the tolerances specified in paragraph (g)(1)(xv) of this section.

* * * * *

(xx) * * *

(C) Turn off all the fans specified in § 86.1207–96(d). Also, the time that the vehicle's engine compartment cover is open for removal of air intake equipment, if applicable, shall be minimized to avoid loss of heat from the engine compartment.

* * * * *

(2) *Point-source method.* * * *

(v) Fans shall be positioned as described in § 86.1207–96(d).

* * * * *

(vii) The temperature and pressure recording systems shall be started. Measurement of vapor temperature is optional during the running loss test. If vapor temperature is not measured, fuel tank pressure need not be measured.

* * * * *

(x) The ambient temperature shall be maintained at 95±5° F (95±2° F on average) during the running loss test, measured at the inlet to the cooling fan in front of the vehicle; it shall be recorded at least every 60 seconds.

* * * * *

(xii) The tank pressure requirements described in paragraph (g)(1)(xvi) of this section apply also to running loss testing by the point source method.

* * * * *

(xv) At the end of the running loss test, turn off all the fans specified in § 86.1207–96(d).

* * * * *

44. Section 86.1238–90 of subpart M is amended by revising paragraph (i) to read as follows:

§ 86.1238–90 Hot soak test.

* * * * *

(i) The enclosure doors shall be closed and sealed within two minutes of engine shutdown and within seven minutes after the end of the exhaust emission test. The steps after the end of the driving cycle should be done as quickly as possible to minimize the time needed to start the hot soak test.

* * * * *

45. Section 86.1238–96 of subpart M is amended by revising paragraphs (a)(2), (b)(2)(v)(A), and (b)(2)(viii) to read as follows:

§ 86.1238–96 Hot soak test.

(a) * * *

(2) *Gaseous-fueled vehicles.* Since gaseous-fueled vehicles are not required to perform a running loss test, the hot soak test shall be conducted within seven minutes after completion of the hot start exhaust test.

(b) * * *

(2) * * *

(v) * * *

(A) Analyze the enclosure atmosphere for hydrocarbons and record. This is the initial (time = 0 minutes) hydrocarbon concentration, $C_{HCi,}$ required in § 86.1243. Hydrocarbon emissions may be sampled continuously during the test period.

* * * * *

(viii) The vehicle shall enter the enclosure; the enclosure doors shall be closed and sealed within 2 minutes of engine shutdown and within seven minutes after the end of the running loss test.

* * * * *

46. Section 86.1243–96 of subpart M is amended by revising paragraphs (b)(1)(i) introductory text and equation, (b)(1)(i)(D), (b)(2)(i)(B), and (b)(2)(ii)(B), adding paragraph (b)(1)(iii), and removing and reserving paragraphs (b)(1)(i)(C) and (b)(1)(i)(E) to read as follows:

§ 86.1243–96 Calculations; evaporative emissions.

* * * * *

(b) * * *

(1) * * *

(i) Methanol emissions:

$$M_{CH_3OH} = V_n \times \left[\frac{\left(C_{MS1f} \times AV_{1f}\right) + \left(C_{MS2f} \times AV_{2f}\right)}{V_{E_f}} \right] - \left[\frac{\left(C_{MS1i} \times AV_{1i}\right) + \left(C_{MS2i} \times AV_{2i}\right)}{V_{E_i}} \right] + \left(M_{CH_3OH,out} - M_{CH_3OH,in}\right)$$

Where:

* * * * *

(C) [Reserved].

(D) V_E=Volume of sample withdrawn, ft^3. Sample volumes must be corrected for differences in temperature to be consistent with determination of V_n, prior to being used in the equation.

(E) [Reserved].

* * * * *

(iii) For variable-volume enclosures, defined in § 86.1207(a)(1)(i), the following simplified form of the hydrocarbon mass change equation may be used:

$$M_{HC} = \left(\frac{kP_B V_n \times 10^{-4}}{T} \right) \times \left[\left(C_{HC_f} - rC_{CH_3OH_f} \right) - \left(C_{HC_i} - rC_{CH_3OH_i} \right) \right]$$

(2) * * *

(i) * * *

(B) ρ_{CH3OH}= 37.71 g/ft^3, density of pure vapor at 68° F.

* * * * *

(ii) * * *

(B) ρ_{HC}= 16.88 g/ft^3, density of pure vapor at 68° F (for hydrogen to carbon ratio of 2.3).

* * * * *

47. Section 86.1246–96 of subpart M is amended by revising paragraphs (f), (i)(1), and (i)(2) to read as follows:

§ 86.1246–96 Fuel dispensing spitback procedure.

* * * * *

(f) Following the preconditioning drive, the vehicle shall be moved or driven at minimum throttle to the refueling area.

* * * * *

(i) * * *

(1) The fueling operation shall be started within 4 minutes after the vehicle is turned off and within 8 minutes after completion of the preconditioning drive. The average temperature of the dispensed fuel shall be 65±5° F (18±3° C).

(2) The fuel shall be dispensed at a rate of 9.8±0.3 gallons/minute (37.1±1.1 *l*/min) until the automatic shutoff is activated.

* * * * *

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